

S.0 Summary

S.1 Introduction and Background

The California High-Speed Rail Authority (Authority), a state governing board formed in 1996, has responsibility for planning, designing, constructing, and operating the California High-Speed Train (HST). Its mandate is to develop a high-speed rail system coordinating with the state's existing transportation network, which includes intercity rail and bus lines, regional commuter rail lines, urban rail and bus transit lines, highways, and airports.

The California High-Speed Train System (HST System) will provide intercity, high-speed service on more than 800 miles of tracks throughout California, connecting the major population centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. Figure S-1 shows this system. It will use state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, including contemporary safety, signaling, and enhanced automatic train-control systems, with trains capable of operating up to 220 miles per hour (mph) over a fully grade-separated, dedicated track alignment.

High-Speed Train System

The system that includes the HST guideways, structures, stations, traction-powered substations, and maintenance facilities.

The Authority plans two phases. Phase 1¹ will connect San Francisco to Los Angeles/Anaheim via the Pacheco Pass and the Central Valley with a mandated express travel time of 2 hours and 40 minutes or less. Phase 2 will connect the Central Valley to the state's capital, Sacramento, and will extend the system from Los Angeles to San Diego.

The Fresno to Bakersfield HST Section, shown on Figure S-2, is a critical Phase 1 link connecting to the Merced to Fresno and Bay Area HST sections to the north and the Bakersfield to Palmdale and Palmdale to Los Angeles HST sections to the south. The Fresno to Bakersfield Section includes HST stations in the cities of Fresno and Bakersfield and a third station in the vicinity of Hanford (the Kings/Tulare Regional Station) that would serve the Hanford, Visalia, and Tulare area. ~~The Kings/Tulare Regional Station would be built when travel demand warrants it.~~ The Fresno and Bakersfield stations are this section's beginning and ending points, or project termini.

Because the Fresno to Bakersfield Section alignment alternatives do not converge until they reach Osnell Street, the environmental analysis presented in this EIR/EIS extends through Bakersfield to Osnell Street. The environmental analysis has been carried to Osnell Street to inform decision makers of the potential effects to East Bakersfield resulting from the selection of an alternative alignment through the Bakersfield Metropolitan Area.

There are five alternative heavy maintenance facility (HMF) sites being considered in the Fresno to Bakersfield Section. The HMF would support the assembly, testing, commissioning, and acceptance of high-speed train vehicles (rolling stock) prior to the start-up of operations. After initial operations begin, the HMF would assume maintenance and major repair functions to sustain the regular system operation and assembly of new rolling stock. One HMF is required for the HST System, and it would be located in the Central Valley in either the Merced to Fresno Section or the Fresno to Bakersfield Section.

¹ Phase 1 would be built in stages dependent on funding availability.



Figure S-1
California HST System initial study corridors

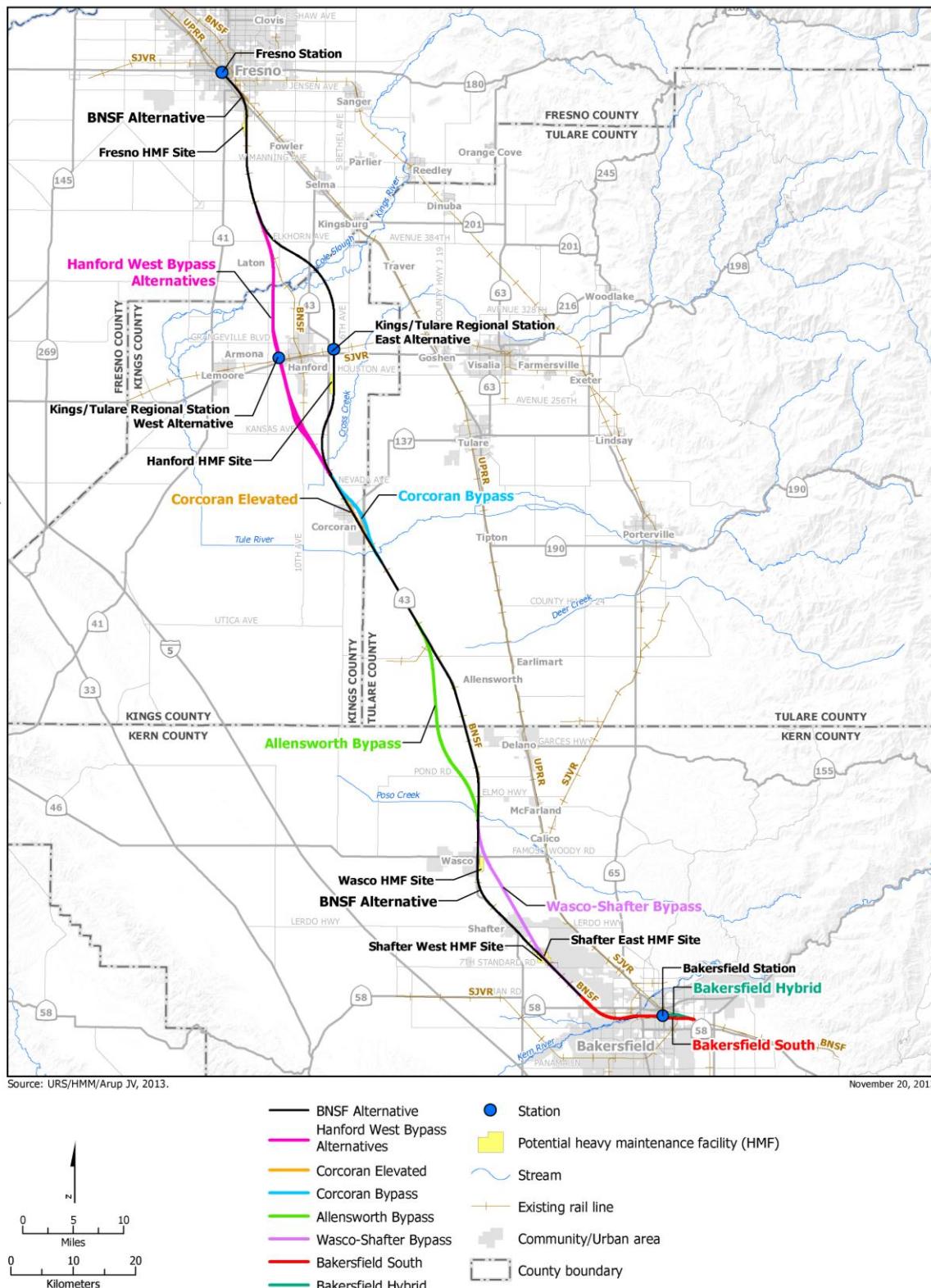


Figure S-2
Fresno to Bakersfield Section project alternatives

S.2 Tiered Environmental Review: Final Statewide Program EIR/EIS and Fresno to Bakersfield Section Project EIR/EIS

The Council on Environmental Quality provides for National Environmental Policy Act (NEPA) decision-making through a phased process. This process is referred to as *tiered* decision making. This phased decision-making process provides for a broad-level programmatic decision at the first tier, with a first-tier EIS, to be followed by more specific decisions at the second-tier, with one or more second-tier EISs. The NEPA tiering process allows for incremental decision-making for large projects that would be too extensive and cumbersome to analyze in a traditional project EIS. The California Environmental Quality Act (CEQA) also encourages tiering and also provides for first-tier and second-tier EIRs.

The Fresno to Bakersfield Section EIR/EIS is a second-tier EIR/EIS that tiers off two first-tier, program EIR/EIS documents, and provides project-level information for decision-making on this portion of the HST System. The Authority and the Federal Railroad Administration (FRA) prepared the 2005 *Final Program EIR/EIS for the Proposed California High-Speed Train System EIR/EIS* (Statewide Program EIR/EIS) (Authority and FRA 2005), which provided a first-tier analysis of the general effects of implementing the HST System across two-thirds of the state. The 2008 *Bay Area to Central Valley HST Final Program EIR/EIS* (Bay Area to Central Valley Program EIR/EIS) (Authority and FRA 2008), and the Authority's 2012 *Bay Area to Central Valley HST Partially Revised Final Program EIR* (Authority 2012) were also first-tier and programmatic, but focused on the Bay Area to Central Valley region. These first-tier EIR/EIS documents provided the FRA and the Authority with the environmental analysis necessary for the evaluation of the overall HST System, and for making broad decisions about general high-speed train alignments and station locations for further study in second-tier EIR/EISs. These documents are available on the Authority's website: www.cahighspeedrail.ca.gov. The Fresno to Bakersfield Section EIR/EIS analyzes the environmental impacts and benefits of implementing the high-speed train in the more geographically limited area between Fresno and Bakersfield, and is based on more detailed project planning and engineering. The analysis therefore builds on the earlier decisions and program EIR/EISs, and provides more site-specific and detailed analysis.

For the California HST System, including the Fresno to Bakersfield Section, the FRA is the lead federal agency for compliance with NEPA and other federal laws. The Authority is the project sponsor and joint-lead agency under NEPA, as well as the state lead agency under CEQA. There are two cooperating agencies included in the NEPA review process. The USACE agreed by letter, dated December 30, 2009, to participate as a cooperating agency under NEPA. The Surface Transportation Board (STB), by letter dated May 2, 2013, is also participating as a cooperating agency under NEPA.

The Authority and FRA circulated the Draft EIR/EIS for the Fresno to Bakersfield Section to affected local jurisdictions, state and federal agencies, tribes, community organizations, other interest groups, and interested individuals for 60 days from August 15 to October 13, 2011. Because of substantive comments received during the public and agency review of the Draft EIR/EIS, the Authority decided to reintroduce two alternative alignments west of Hanford (the Hanford West Bypass 1 and 2 Alternatives) that would be consistent with the preferred alternative identified in the Statewide Program EIR/EIS, and present another alternative in Bakersfield (Bakersfield Hybrid Alternative) that would minimize impacts to residential and community facilities in the Bakersfield Metropolitan Area.

After evaluating the proposed addition of the Hanford West Bypass 1 and 2 and Bakersfield Hybrid alternatives and the refinements being considered for the other Fresno to Bakersfield alternatives, the Authority determined, pursuant to Section 15088.5 of the CEQA Guidelines, that

it was necessary to prepare and circulate a Revised Draft EIR to analyze the potential environmental impacts that might result from the new alternatives and the refinements to the other alternatives. Pursuant to 40 C.F.R. 1502.9, the FRA also determined that these changes to the project alternatives made it necessary to prepare a Supplemental Draft EIS. Therefore, the Authority and FRA, in cooperation with the U.S. Army Corps of Engineers (USACE), circulated a Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (Revised Draft EIR/Supplemental Draft EIS) for the Fresno to Bakersfield Section to affected local jurisdictions, state and federal agencies, tribes, community organizations, other interested groups, and individuals for 90 days from July 20, 2012, to October 19, 2012.

S.3 Issues Raised during Public Outreach

The Authority held five public scoping meetings between March 18 and March 26, 2009, in the Fresno to Bakersfield Section project corridor, with a total of 400 people attending the five meetings. Scoping helps to determine the focus and content of an EIR/EIS. The Authority and FRA received a total of 188 comments from individuals and organizations, as well as comments from 33 agencies, on the proposed project. Major issues identified as a result of scoping follow.

The Authority held four advertised public workshops in August 2011 in Rosedale, Wasco, Corcoran, and Fresno, at which members of the public could review copies of the Draft EIR/EIS and obtain help in identifying how the project might affect their property. The Authority and FRA held formal hearings in Fresno, Hanford, and Bakersfield, at written and verbal comments were accepted on September 20, 21, and 22, 2011. In late spring of 2012, public information meetings were held during preparation of the Revised Draft EIR/Supplemental Draft EIS to inform the public about the alignment alternatives and the associated impact analysis for the Fresno to Bakersfield Section, and status of the EIR/EIS preparation. Four informational workshops were held to provide information on the contents of the environmental documents, and three formal public hearings were held following publication of the Revised Draft EIR/Supplemental Draft EIS to solicit public comments. Major issues identified as a result of these meetings follow.

- Visual impacts of the project, in general, stations, elevated track, glare.
- HST emissions, particularly dust and its effects on agriculture.
- Conversion of agricultural land to nonagricultural uses.
- Compliance with the Williamson Act.
- Impacts on farm operations.
- Impacts on low-income and minority environmental justice communities.
- Impacts on community cohesion.
- Fiscal impacts on the state and local jurisdictions.
- Construction impacts.
- System safety with regard to derailments.
- Impacts on property owners.
- Growth-inducing effects of a new transportation system in the San Joaquin Valley.
- Water resource impacts.
- Harm to historic structures.
- Hazardous materials impacts.
- Electromagnetic field impacts on humans and animals.
- Impacts on special-status species and their habitats.
- Noise impacts.
- Transportation impacts: crossings, blocked roads, blocked intersections, and congestion if the HST is not implemented.
- Impacts on Amtrak.
- Global-warming effects if the HST is not implemented.
- Impacts on confined-animal agricultural operations in Kings County.

S.4 Summary of Changes Between Revised Draft EIR/ Supplemental Draft EIS and Final EIR/EIS

Since the close of the public comment period on the Revised Draft EIR/Supplemental Draft EIS in October 2012, the Authority and FRA have reviewed the extensive public comments received. The Authority has continued to consult with local jurisdictions and property owners along the alignment alternatives. The Authority and FRA have also continued to work closely with regulatory agencies with jurisdiction over some components of the project. These consultations have resulted in project refinements, minor changes to the impacts analysis, and refinement of mitigation measures. The following is a summary of these changes.

S.4.1 Summary of Project Changes

Designs for Road Overcrossings and Undercrossings for All Alternatives Revised to be Consistent with Local Government Requirements: The Authority received extensive input from cities and counties along the alignment alternatives recommending that the Authority's design for the road overcrossings and undercrossings conform to local government design speed requirements. All alignment alternatives have been refined to conform to local requirements where practicable, or exceptions to the local design criteria have been identified as design exceptions that will be mutually agreed among the parties for the preferred alternative as the design advances.

Design for BNSF Alternative Kings River Crossing Revised to Accommodate Levee Maintenance Access for Kings River Conservation District: The Authority received input from the Kings River Conservation District expressing concerns over maintaining appropriate access for levee maintenance along the Kings River. The Final EIR/EIS increases the vertical profile of the alignment to 18 feet above the levees on the Kings River complex, but narrows its horizontal footprint. The revised design reduces the impacts on wildlife and habitat, and eliminates the previously proposed depression of State Route (SR) 43, and the related flood evacuation concerns raised in comments. The profile of SR 43 no longer will be altered, as the higher HST structure would provide the required clearance over SR 43 at its current grade.

Design in the Vicinity of SR 43 Revised to Avoid Caltrans Right of Way: In response to input from Caltrans, the design of both the BNSF, Corcoran Elevated, and Corcoran Bypass alternatives in the vicinity of SR 43 was moved from the west side of SR 43 to the east side to maintain the Caltrans-owned right of way and better accommodate future widening of the state highway.

Design Revised to Accommodate Minor Adjustments in the Location of Transmission Line Facilities: The design of the BNSF Alternative east of Hanford was revised to incorporate an improved relocation of a 115-kV line to reduce the number and skew of transmission line crossings of the HST alignment, and fully comply with CPUC General Order 95 with respect to "topple" clearance for the transmission line towers relative to the HST overhead contact system. The design also adjusted to route the section of the 115-kV line that crosses the proposed Kings/Tulare Regional Station-East site underground to reduce aerial conflicts and improve aesthetics at the station.

Design Revised to Include Potential for Sewer Line along East Lacey Boulevard to Serve the Kings/Tulare Regional Station-East Alternative: The Revised Draft EIR/Supplemental Draft EIS identified that the Kings/Tulare Regional Station-East alternative could be served by City of Hanford sewer being extended to the site, or by an onsite sewage treatment approach. At the time of the Revised Draft EIR/Supplemental Draft EIS, the City of Hanford had indicated that they did not plan to extend a sewer line to the east. The City has

revised its plans, however, and the Draft EIR for the Highway 43/198 Commercial Center indicates the City is now planning to extend a sewer line along East Lacey Boulevard closer to the Kings/Tulare Regional Station–East site. The proposed route for wastewater utility lines would extend from the Kings/Tulare Regional Station-East south along the proposed HST right-of-way to East Lacey Boulevard and then west on East Lacey Boulevard.

Design Revised to Reduce Impacts on Businesses: The Authority has refined the design of multiple alignment alternatives to reduce impacts on businesses. These include an adjustment to reduce impacts of the BNSF Alternative on SunnyGem in Wasco and a redesigned approach relocation for the Lone Star Rail Spur in Shafter. An adjustment to the viaduct structure on the Bakersfield Hybrid Alternative was made to avoid direct impact on the Salon Juarez Mutual Aid Society.

Design Revised to Reduce Environmental Impacts: Refinements of the design were made to avoid sensitive environmental resources, such as narrowing the HST right of way to avoid the Salon Juarez Mutual Aid Society and adjusting footing placements for the HST viaduct spanning the historic Friant-Kern Canal in Bakersfield, and tailoring berm relocations along SR 43 north of Corcoran to minimize impacts on lacustrine habitat. Additional modifications were made in a number of places that further avoid and/or minimize impacts on aquatic resources. For example, the design over the King River complex on the BNSF Alternative was modified from several bridge structures to an elevated section that spans the levees by approximately 18 feet, thus minimizing the amount of disturbance on aquatic resources and allowing for wildlife movement. During the design refinement process, engineers worked with biologist to review the proposed footprints and identify key resources where impacts should be avoided or minimized.

Design Revised to Add Minor Project Features and Geometric Refinements: In response to updated Authority technical design requirements, the project footprint in the Final EIR/EIS has added a small amount of area to cover emergency access roads and maintenance turnarounds along the alignment. Additional design refinements were made to increase segment lengths between horizontal and vertical curves in the alignment.

Design Revised for Hanford West Bypass Alternatives: The Hanford West Bypass 1 and 2 alternatives were modified to avoid use of the properties protected under Section 4(f) at 13148 Grangeville Boulevard and 9860 13th Avenue. From approximately Flint Avenue south to Idaho Avenue (approximately 9 miles), the Hanford West Bypass 1 and 2 Modified alternatives diverge to the west of the Hanford West Bypass 1 and 2 alternatives by a maximum of about 570 feet. South of Idaho Avenue, the modified alternatives diverge primarily to the east of the Hanford West Bypass 1 and 2 alternatives. For the Hanford West Bypass 1 and 2 alternatives, an at-grade station was carried into the Final EIR/EIS. For the Hanford West Bypass 1 and 2 Modified alternatives, a below-grade station was evaluated in the Final EIR/EIS.

Design Revised for Foundations: The foundations of the viaducts were revised throughout the Fresno to Bakersfield Section to eliminate the use of “mono-shaft” (single, large diameter pile supporting a beam) foundations and to replace them with bents (two piles supporting a beam) as a superior design approach. In some areas, the project footprint was increased slightly to allow for straddle bent foundations and future maintenance access for the viaduct and straddle bent foundations.

Refinements to allow for Seismic Upgrades of Caltrans Overcrossings: Temporary construction easements were expanded in Fresno to allow for possible seismic upgrades of the existing SR 41 structure over the BNSF Alternative and the existing City of Fresno bridge on Jensen Avenue that will span the BNSF Alternative.

S.4.2 Summary of Environmental Analysis Changes

The Final EIR/EIS includes a number of revisions to the environmental analysis that can be summarized as follows:

- Revisions in the text in response to comments on the Revised Draft EIR/Supplemental Draft EIS to clarify and amplify the analysis and discussion. For example, the EPA provided a comment to provide additional analysis of local air quality impacts to sensitive receptors. This analysis was completed and added to the Final EIR/EIS.
- Correction to a technical error in the traffic modeling for projected station area traffic intersection impacts.
- Revisions to the analysis of greenhouse gas project impacts and benefits based on refined and updated modeling tools and updated assumptions.
- Revisions to reflect information gathered and analyses conducted in consultation with federal agencies for compliance with Section 106 of the National Historic Preservation Act, Section 404 of the Clean Water Act, and Section 176(c) of the Clean Air Act.
- Revisions to acreage tables that reflect the above changes to the project design, and corollary changes to the environmental analysis, where necessary.
- Revisions to mitigation measures for biological resources and wetlands impacts to incorporate recommendations of federal and state regulatory agencies.
- Revisions to add information about the range of potential off-site mitigation areas for biological resources.
- Reformatted environmental justice discussion and added clarity to the analysis.
- Inclusion of material as identified by NEPA and CEQA for a Final EIR/EIS, including copies of written comment letters and verbal comments received during the public circulation period for the Draft EIR/EIS and Revised Draft EIR/Supplemental Draft EIS, and responses to those comments.
- Revisions to cost data in Chapter 5 based on the updated 15% design quantities analysis and the draft 2014 Business Plan.

The shaded areas in the Final EIR/EIS are intended to provide the reader with a simplified way to identify much of the revised language changes and refinements that differ from the text in the Revised Draft EIR/Supplemental Draft EIR. However, it is not a word-for-word representation and not all changes are shaded. The shading is a guide to help the reader to navigate the revisions. As discussed above, the alternatives have been refined since circulation of the Revised Draft EIR/Supplemental Draft EIS. Accordingly, the tables in many of the chapters are gray to indicate analytical changes that result from design refinements.

S.4.3 Evaluation of Need for CEQA Recirculation or NEPA Supplement

Neither NEPA nor CEQA are intended to freeze the status of a project as of the time of circulation of a Draft EIR/EIS. Both environmental statutes accommodate the fact that projects may evolve and be refined in response to public input. Under NEPA, a supplemental Draft EIS is required only if the agency makes substantial changes in the proposed action that are relevant to environmental concerns, or there are significant new circumstances or new information relevant to environmental concerns and bearing on the proposed action and its impacts (40 CFR §

1502.9(c)). Under CEQA, a recirculation of the Draft EIR is required only when significant new information is added to an EIR after public review, but before certification (CEQA Guidelines, § 15088.5). New information added to an EIR is not 'significant' unless 'the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project's proponents have declined to implement' (Guidelines, § 15088.5(a)).

The Authority and FRA have carefully considered whether the above changes would necessitate either a recirculated Draft EIR or a supplement to the Draft EIS. None of the above changes result in a new adverse impact on the environment or a substantial increase in the intensity or severity of a previously disclosed adverse impact. Many of the project refinements are responsive to comments received on the Revised Draft EIR/Supplemental Draft EIS, and they help minimize environmental impacts, strengthen mitigation measures, or assist in making the project alternatives incrementally more consistent with local government or individual preferences. Therefore, the Authority and the FRA have determined that recirculation of the EIR or a supplement to the EIS is not required.

S.5 Purpose of and Need for the HST System and the Fresno to Bakersfield Section

S.5.1 Purpose of the HST System

The purpose of the California HST System is to provide a reliable high-speed, electric-powered train system that links the major metropolitan areas of the state and that delivers predictable and consistent travel times. A further objective is to provide an interface with commercial airports, mass transit, and the highway network, and to relieve capacity constraints of the existing transportation system as increases in intercity travel demand in California occur, in a manner sensitive to and protective of California's unique natural resources.

S.5.2 Purpose of the Fresno to Bakersfield Section

The purpose of this project is to implement the Fresno to Bakersfield Section of the California HST System to provide the public with electric-powered high-speed rail service that provides predictable and consistent travel times between major urban centers and connectivity to airports, mass transit, and the highway network in the south San Joaquin Valley and connects the northern and southern portions of the system.

S.5.3 Objectives for the HST System Statewide and within the Central San Joaquin Valley Region

The Authority has responded to its mandate to plan, build, and operate an HST System that is coordinated with California's existing transportation network by adopting the following objectives and policies for the proposed HST System:

- Provide intercity travel capacity to supplement critically over-used interstate highways and commercial airports.
- Meet future intercity travel demand that will be unmet by current transportation systems, and increase capacity for intercity mobility.
- Maximize intermodal transportation opportunities by locating stations to connect with local transit, airports, and highways.

- Improve the intercity travel experience for Californians by providing comfortable, safe, frequent, and reliable high-speed travel.
- Provide a sustainable reduction in travel time between major urban centers.
- Increase the efficiency of the intercity transportation system.
- Maximize the use of existing transportation corridors and rights-of-way, to the extent feasible.
- Develop a practical and economically viable transportation system that can be implemented in phases by 2020 and generate revenues in excess of operations and maintenance costs.
- Provide intercity travel in a manner sensitive to and protective of the region's natural and agricultural resources and reduce emissions and vehicle miles traveled for intercity trips.

The approximately 114-mile-long Fresno to Bakersfield Section is an essential part of the statewide HST System. As part of the Central Valley section of the HST System, it would provide Fresno, Visalia, Tulare, Hanford, and Bakersfield access to a new transportation mode, and would contribute to increased mobility throughout California. This section will connect the south San Joaquin Valley region to the rest of the statewide HST System via Fresno, Kings, Tulare, and Kern counties (see Figure S-1).

S.5.4 Need for the HST System Statewide and within the South San Joaquin Valley Region

The need for an HST System exists statewide, with regional areas contributing to this need. The Fresno to Bakersfield Section is an essential component of the statewide HST System.

The capacity of California's intercity transportation system, including the south San Joaquin Valley region, is insufficient to meet existing and future travel demands, and the current and projected future congestion of the system will continue to result in deteriorating air quality, reduced reliability, and increased travel times. The current transportation system has not kept pace with the increase in population, economic activity, and tourism within the state, including that in the south San Joaquin Valley region. The interstate highway system, commercial airports, and conventional passenger rail system serving the intercity travel market are operating at or near capacity and will require large public investments for maintenance and expansion to meet existing demand and future growth over the next 25 years and beyond. Moreover, the feasibility of expanding many major highways and key airports is uncertain; some needed expansions might be impractical or are constrained by physical, political, and other factors. The need for improvements to intercity travel in California, including intercity travel between the southern San Joaquin Valley, the Bay Area, Sacramento, and Southern California relates to the following issues:

- Future growth in demand for intercity travel, including the growth in demand within the south San Joaquin Valley region.
- Capacity constraints that will result in increasing congestion and travel delays, including those in the south San Joaquin Valley region.
- Unreliability of travel stemming from congestion and delays, weather conditions, accidents, and other factors that affect the quality of life and economic well-being of residents, businesses, and tourism in California, including the south San Joaquin Valley region.

- Reduced mobility as a result of increasing demand on limited modal connections between major airports, transit systems, and passenger rail in the state, including the south San Joaquin Valley region.
- Poor and deteriorating air quality and pressure on natural resources and agricultural lands as a result of expanded highways and airports and urban development pressures, including those within the south San Joaquin Valley region.

Geographically, the Fresno to Bakersfield Section is located in the center of California. This region significantly contributes to the statewide need for a new intercity transportation service that would connect it with the major population and economic centers and to other regions of the state. The major population, economic, and political centers are located on the coasts of Northern and Southern California and in the Sacramento Valley.

S.6 Alternatives

This section summarizes the alternatives evaluated in the Fresno to Bakersfield Section Project EIR/EIS. The 2005 Statewide Program EIR/EIS (Authority and FRA 2005), the 2008 Bay Area to Central Valley Program EIR/EIS (Authority and FRA 2008), public and agency input from the scoping process, extensive local and agency involvement during Technical Working Group² (TWG) meetings, other stakeholder meetings, and public and agency comments on the Draft EIR/EIS and Revised Draft EIR/Supplemental Draft EIS provided input to the Authority and FRA in developing these alternatives.

The track alignment, stations, and heavy maintenance facility (HMF) have been through an alternatives analysis screening process, which considered the effects of the alternatives on the social, natural, and built environment. The screening was performed in collaboration with teams for the adjacent Merced to Fresno Section where the Fresno to Bakersfield and Merced to Fresno sections overlap. In addition to the HST alternatives, a No Project Alternative and HMF alternatives were studied.

S.6.1 No Project Alternative

The No Project Alternative is the basis for comparison of the HST alternatives. The No Project Alternative represents the state's transportation system (highway, air, bus, conventional rail) as it is currently and as it would be after implementation of programs or projects that are currently projected in regional transportation plans (RTPs), have identified funds for implementation, and are expected to be in place by 2035, as well as any major planned land use changes. The entire San Joaquin Valley is projected to grow at a rate higher than any other region in California. The four counties—Fresno, Kings, Tulare, and Kern—are projected to continue to grow at an average of about 3% per year. By 2035, the four-county study area will grow from a 2010 population of 2,397,451 to 4,127,624 for a net increase of 1,730,173 people, or 72%. Accommodating this new population will require land and necessitate the construction of new infrastructure, including roadways, electric power generation, water and wastewater facilities, sewer, schools, hospitals, and commercial and industrial facilities. To support this growth, development would consume an estimated 173,000 acres because, according to current planning trends, these counties would develop at a density of approximately 10 persons per acre (see Section 2.4.1, No Project Description, for justification).

² Technical Working Groups were composed of senior staff from county and city public works, planning, economic development, and administrative departments.

S.6.2 Fresno to Bakersfield Section High-Speed Train Alternatives

This Project EIR/EIS evaluates 11 HST alternatives: the BNSF, the Hanford West Bypass 1, the Hanford West Bypass 1 Modified, the Hanford West Bypass 2, the Hanford West Bypass 2 Modified, the Corcoran Elevated, the Corcoran Bypass, the Allensworth Bypass, the Wasco-Shafter Bypass, the Bakersfield South, and the Bakersfield Hybrid. Figure S-2 shows the 11 alternatives analyzed in this Project EIR/EIS. They would extend between and include the proposed Downtown Fresno and Downtown Bakersfield stations, with a Kings/Tulare Regional Station to the east of Hanford on the BNSF Alternative (the Kings/Tulare Regional Station–East Alternative) or to the west of Hanford on either the Hanford West Bypass 1, Hanford West Bypass 1 Modified, Hanford West Bypass 2, or the Hanford West Bypass 2 Modified alternatives (the Kings/Tulare Regional Station–West Alternative). The estimated trip time between the Fresno and Bakersfield stations would be approximately 40 minutes. The three stations would see a mix of stopping trains and through trains; the number of trains would peak after full build out of the system. Scenarios were developed to take into account various levels of ridership that could occur. In 2035 for the high ridership scenario, the full system would see four trains per hour stop at each of the Fresno, Kings/Tulare Regional, and Bakersfield stations in each direction at the peak, and six trains run through. At the off-peak, the same number of stops would be made, but the through trains would decrease to three per hour.

The BNSF Alternative is a single continuous alignment that extends from the northern end of the Fresno Station tracks to the southern end of the Bakersfield station tracks. It begins in Downtown Fresno on the west side of the Union Pacific Railroad (UPRR) tracks, proceeds south through Fresno adjacent to the UPRR tracks, crossing under East Jensen Avenue and then over Golden State Boulevard and State Route (SR) 99 as it curves south to join the BNSF Railway. The BNSF Alternative diverges from the BNSF Railway north of the Kings River and travels east of the City of Hanford before rejoining the BNSF Railway on its western side, north of the City of Corcoran. From there, the BNSF Alternative follows the BNSF Railway south through Corcoran, Wasco, and Shafter into the Bakersfield Metropolitan Area where it generally follows the BNSF Railway corridor through Bakersfield to the Bakersfield Station.

The additional 10 alternative alignments diverge from the BNSF Alternative at various locations between Fresno and Bakersfield. The Hanford West Bypass 1 and 2 alternatives diverge from the BNSF Alternative at approximately East Conejo Avenue; both alternatives pass the city of Hanford to the west and rejoin the BNSF Alternative at SR 43 north of the city of Corcoran. These two alternatives are similar to the preferred alternative in the Statewide Program EIR/EIS. The Hanford West Bypass 1 and 2 alternatives are on the same alignment from north to south until about Jackson Avenue, where the Hanford West Bypass 1 Alternative curves farther to the west to join with the BNSF Alternative north of the city of Corcoran. The Hanford West Bypass 2 Alternative remains on a more southeasterly route to join with either the Corcoran Elevated Alternative or the Corcoran Bypass Alternative. The Hanford West Bypass 1 and 2 Modified alternatives are variations of the Hanford West Bypass 1 and 2 alternatives. The modified alternatives diverge as much as about 600 feet to the west of the Hanford West Bypass 1 and 2 alternatives from Flint Avenue to about Idaho Avenue to avoid use of two properties that are protected under Section 4(f) of the Department of Transportation Act. South of Idaho Avenue, the two modified alternatives diverge primarily to the east of the Hanford West Bypass 1 and 2 alternatives so that the Hanford West Bypass 1 Modified Alternative can align with the BNSF Alternative through Corcoran, and the Hanford West Bypass 2 Modified Alternative can align with the Corcoran Elevated and Corcoran Bypass alternatives. The Corcoran Elevated Alternative would be the same as the corresponding segment of the BNSF Alternative except that it would pass through the city of Corcoran on the eastern side of the BNSF Railway right-of-way on an elevated structure. The Corcoran Bypass Alternative would diverge from the BNSF Alternative at approximately Nevada Avenue and swing east of Corcoran, rejoining the BNSF Alternative at Avenue 136 south of Corcoran. The Allensworth Bypass Alternative would diverge from the BNSF

Alternative at Avenue 84 in Tulare County and swing west of Allensworth State Historic Park, rejoining the BNSF Alternative at Elmo Highway in Kern County. The Wasco-Shafter Bypass Alternative would diverge from the BNSF Alternative between Taussig Avenue and Zachary Avenue, bypassing Wasco and Shafter to the east, and rejoin the BNSF Alternative at 7th Standard Road. The Bakersfield South Alternative parallels the BNSF Alternative from Rosedale Highway (SR 58) to Chester Avenue at varying distances to the north. The alternative then curves south and parallels California Avenue to its terminus at the southern end of the Bakersfield station tracks. The Bakersfield Hybrid Alternative would roughly follow the Bakersfield South Alternative alignment from Hageman Road to the Bakersfield station; it would then swing north of the BNSF Alternative alignment through East Bakersfield to Osnell Street.

S.6.3 Station Area Development

The presence of an HST would provide tremendous opportunities to revitalize the downtowns of Fresno and Bakersfield through urban design; diversity of higher density mixed use development; and improved transit, bike, and pedestrian connectivity. The higher densities in the station areas would result in higher levels of transit and the stations could become major transit hubs. The presence of the stations would also attract office development to the downtown areas because of the improved access to the larger markets of Los Angeles and the Bay Area, and the stations could become 24-hour destinations as more commercial businesses are attracted to the area once full build out of the system is completed. In addition, residential growth would be expected as a result of increases in retail, nightlife, and improved multimodal connectivity, which could lessen the desire of residents to commute to Los Angeles or the Bay Area (Authority and FRA 2008).

Both the cities of Fresno and Bakersfield have been offered station area planning grants. The city of Fresno has accepted a grant and is pursuing an update of its general plan to reflect the addition of an HST station in the downtown area. The City of Bakersfield has not accepted a grant to update its general plan to reflect a downtown station. Both downtowns are poised to become strong activity centers with the addition of the HST. The projected growth for this region is approximately an additional 1.7 million persons by 2035, with comparable growth in employment even before adding the HST to the Central Valley. The project is estimated to bring 8,400 and 9,200 daily passengers to Fresno and Bakersfield, respectively, and, when combined with the projected growth for the valley, would result in an abundance of people in the downtown areas. The HST would provide a catalyst to concentrate the investment created by population growth at the urban centers that provide interregional connectivity with other metropolitan centers. The Fresno and Bakersfield HST stations would be compatible with local zoning for higher density development and would build upon existing activity centers. The station areas and the surrounding regions would realize beneficial effects, including increased employment, recreation, and community cohesion. No incompatible changes in land use patterns or intensities are anticipated with these urban stations.

The Kings/Tulare Regional Station is one of the few stations in the California HST System that is not proposed in a downtown urban area. The two alternative sites for this station were selected to serve residents in the Lemoore/Hanford, Visalia, and Tulare areas. The Kings/Tulare Regional Station–East Alternative is immediately east of the City of Hanford’s primary sphere of influence and is adjacent to the intersection of SR 198 and SR 43 on the BNSF Alternative Alignment. These two highways would provide access to the station for shuttle bus service from the communities in the area. The Kings/Tulare Regional Station–West Alternative is situated between the city of Hanford and the unincorporated community of Armona on the Hanford West Bypass 1 and 2 alternatives and Hanford West Bypass 1 and 2 Modified alternatives. SR 198 would provide access to the station for shuttle bus service from the communities in the region. Of the two sites considered for this regional station, the Kings/Tulare Regional Station–East Alternative has the larger population within a 20-mile area. The 2007 population within the 20-mile catchment area

for the Kings/Tulare Regional Station–East Alternative was 424,700; the population in this area is projected to increase to 683,300 people by 2030 (Authority 2007).

The Hanford and Kings County land use designations and zoning for the station sites are mostly compatible with an HST station. For the Kings/Tulare Regional Station–East Alternative, the site is zoned as light industrial by Kings County and the station would be compatible with this zoning; however, the surrounding land is currently in agricultural production. Hanford circulated a Draft EIR in October 2013 to amend its General Plan for a 58-acre site in the northwest quadrant of the SR 43/SR 198 interchange to facilitate the ultimate development of about 500,000 square feet of commercial buildings and up to 200 apartment units. Costco plans to build a 150,000-square-foot store in this area, which will anchor the commercial development. This development is immediately southwest of the Kings/Tulare Region Station–East Alternative. The Authority would work with the city and county to develop a station area plan that protects agricultural use of the lands between Hanford and Visalia. This would include limiting parking spaces at the Kings/Tulare Regional Station and providing additional parking, as appropriate, at transit centers in the cities served by the station. The Authority would also acquire agricultural conservation easements in the vicinity of the station as part of mitigation for project impacts to agricultural land. The Kings/Tulare Regional Station–West Alternative site is a mixture of industrial and agricultural lands that are located within the growth corridor for the City of Hanford, and the station would be partially consistent with the land use designations and zoning.

HST Heavy Maintenance Facility

The California HST HMF would support the assembly, testing, commissioning, and acceptance of high-speed rolling stock prior to the start-up of operations. After initial operations begin, the HMF would assume maintenance and major repair functions to sustain the regular operation of the system and activation of new rolling stock as it is delivered.

S.6.4 Heavy Maintenance Facility

The Fresno to Bakersfield Section may include an HMF centrally located on the main north-south line of the HST System to support delivery, testing, and commissioning on the network's first completed segment. The HMF concept plan indicates that the site should encompass approximately 154 acres to accommodate guideways, maintenance shops, parking, administrative offices, roadways, power substation, and storage areas.

The HMF would perform the following functions:

- Trainset assembly.
- Testing and commissioning.
- Train storage.
- Inspection.
- Maintenance.
- Retrofitting.
- Overhaul.

This Final EIR/EIS evaluates five HMF site alternatives (refer to Chapter 2, Alternatives) that are shown on Figure S-2:

- Fresno Works–Fresno HMF Site: Located within the southern limits of the city and county of Fresno next to the BNSF Railway right-of-way between SR 99 and Adams Avenue.
- Kings County–Hanford HMF Site: Located southeast of the City of Hanford, adjacent to and east of SR 43, between Houston and Idaho avenues.

- Kern Council of Governments–Wasco HMF Site: Located east of the City of Wasco between SR 46 and Filburn Street.
- Kern Council of Governments–Shafter East HMF Site: Located in the City of Shafter on the eastern side of the BNSF Railway right-of-way between Burbank Street and 7th Standard Road.
- Kern Council of Governments–Shafter West HMF Site: Located in the City of Shafter on the western side of the BNSF Railway right-of-way between Burbank Street and 7th Standard Road.

S.7 Design Considerations to Avoid and Minimize Impacts

The HST project includes considerations during design to avoid and minimize impacts. Project design incorporates the following measures:

- Follows existing transportation corridors to the extent feasible.
- Uses shared right-of-way when feasible.
- Narrowed footprint with elevated or retained cut profile.
- Spans water crossings where practical.
- Includes passages for wildlife movement.
- Avoids sensitive environmental resources to the extent practical.

S.8 No Project Alternative Impacts

Projected growth and conversion of land to urbanized uses associated with the No Project Alternative are anticipated to have the greatest environmental effect in the study area over the 2010 to 2035 planning period.

Based on the California Department of Finance estimates (2010), which reported that these four counties recorded an average of 3.2 persons per dwelling unit and the preferred residential densities adopted in the San Joaquin Valley Blueprint (ranging from 5.3 units/acre in Tulare County to 8 units/acre in Fresno and Kern counties), it would take about 86,100 acres of land to accommodate future housing. However, this land consumption estimate does not take into account related commercial, transportation, and supporting infrastructure such as parks, water treatment, and medical facilities. With necessary supporting infrastructure, including commercial, office, transportation, parks, and schools, a typical density for an area similar to the San Joaquin Valley would result in 8 to 10 people per acre of land development³ (US 36 DEIS, USDOT et al. 2007). Under this scenario, the total four-county growth projections are for approximately 173,000 acres of land development. Additionally, this development is anticipated to follow current patterns dispersed along the edges of city growth boundaries and into unincorporated areas along highways.

Although the Blueprint is not enforceable on cities and counties within the San Joaquin Valley, it is expected to be the basis for the 2014 Regional Transportation Plans/Sustainable Communities Plans that are required under Senate Bill 375 (San Joaquin Valley Regional Planning Agencies 2009). These plans will direct transportation investment and regional housing needs allocations, and influence land use patterns, in a manner that will reduce greenhouse gas emissions for automobiles and light trucks to meet California Air Resources Board targets for 2020 and 2035.

³ In Denver, the Colorado Department of Transportation studied the land use density as part of the preparation for the US 36 DEIS (2007). The study conducted a GIS analysis of 50 years of land use trends based on historical aerial photos digitized, and then measured actual census data to determine that the gross use of an acre of land supported an average of 10 persons.

Meeting these targets will, by necessity, require strategies and investments that will reduce VMT. This, in turn, is expected to result in Regional Transportation Plans/Sustainable Communities Plans that support higher-density, compact development patterns.

An increase in population and employment creates an increasing need to travel between destinations. The regional measure for growth in travel is the amount of VMT during a year's time frame. Between 2009 and 2035, VMT is projected to increase 67% in the four-county region. According to a statewide transportation projection conducted by Cambridge Systematics, vehicle miles traveled per year in the region are projected to increase from approximately 48 million to almost 80 million in 2035 (Cambridge Systematics 2012). This increase would require an estimated 796,000 additional gallons of petroleum per day in the Fresno to Bakersfield region alone (Bureau of Transportation Statistics 2010).

The conversion of vacant and agricultural land for development will affect and change the character of many of the environmental resources in the study area.

Increasingly stringent federal and state emission control requirements and the replacement of older, higher-polluting vehicles with newer, less-polluting ones would reduce basin-wide air pollution emissions under the No Project Alternative and air quality would improve. Noise would stay at a similar level because local general plans and noise and vibration ordinances are in place to ensure that standards are met.

Future conditions from increased development would likely result in the additional use of electricity and radio frequency (RF) communications that would increase the generation of electromagnetic fields (EMFs) and electromagnetic interference (EMI) in the area. Demand for energy would also increase at a level commensurate with population growth under the No Project Alternative, which would require additional generation and transmission capacity. As stated above, daily VMT in Fresno, Kings, Tulare, and Kern counties would increase, requiring additional demand for petroleum.

Existing trends affecting biological resources are expected to continue or worsen, including habitat loss from development, mortality from vehicle strikes, habitat degradation from pollution (e.g., polluted runoff from stormwater, inadvertent spills of hazardous materials), and noise and dust from development. Effects of the current built environment on hydrology and water resources would continue, including effects from continued operation of existing highways, airports, and railways.

Vehicle Miles Traveled (VMT)

A transportation planning term that measures the extent of motor vehicle operation. Specifically, VMT measures the total number of miles traveled by a vehicle in a specific area over a given period of time.

A consequence of the No Project Alternative would be that the project vicinity would not include the higher-density, transit-oriented development planned around proposed urban HST stations, and the continuation of low-density development might be more likely. This development pattern would increase impervious ground area and an associated increase in stormwater runoff in the urban fringe. Additionally, increases in traffic in Fresno and Kern counties would degrade water quality because of increased pollutants in stormwater from vehicles on roadways. Infrastructure and development projects could cause water or wind erosion, loss of valuable topsoil, and constraints on the potential for oil and gas resource development.

Current trends for accidents related to hazardous materials and wastes would continue with operation of commercial and industrial facilities or during transport of these goods. Under the No Project Alternative, safety and security in the study area would follow current trends. Increased vehicular traffic volumes in Fresno and Kern counties over the next 25 years would be expected to result in increased traffic accidents; however, with planned roadway improvements, it is expected that existing accident trends in the study area would continue into the future. Counties

and cities have the financial mechanisms in place to meet service level goals for emergency responders with the population growth planned for the study area. For these reasons, no adverse or significant impacts on accident prevention or emergency response are anticipated.

The No Project Alternative would not have the community benefits associated with the HST project: reduction of traffic congestion on highways and major roadways and improved mobility and access to jobs, educational opportunities, and recreational resources. To the extent the net increase in housing units and industrial space in the region occurs in incorporated cities, it would be consistent with adopted general plans and policies, which aim to strengthen socioeconomic conditions in existing communities and improve neighborhood amenities, potentially benefiting community cohesion. Emergency response times and access would likely be enhanced from transportation improvements but challenged by dispersed development. The planned projects comprising the No Project Alternative would require acquisition of land and may result in displacement of residences and/or businesses, resulting in some economic benefits as well as potential fiscal and employment losses as a result of relocations. Planned transportation improvements would be made to rail, highway, airport, and transit systems, and commercial and residential development projects would occur throughout the region, which as a whole has substantial numbers of communities of concern. As a result, these planned projects may disproportionately affect minority and/or low-income populations.

As described above, the No Project Alternative would result in up to 173,000 acres of land for future housing and necessary supporting infrastructure. While some infill development could occur without the HST to act as a catalyst, absent an economic incentive, particularly with the demise of redevelopment, little TOD development is likely to be attracted to the downtown areas of Fresno and Bakersfield with the No Project Alternative. As an example, newly planned residential development proposed in the four counties would primarily be located on currently undeveloped land. Isolated development and roadway transportation projects would not provide the same opportunities for redevelopment within the downtown areas of Fresno and Bakersfield as would the development of HST stations. Overall, the No Project Alternative would not be as strong a catalyst in supporting the development envisioned in these general plans and other planning documents as would the HST alternatives.

Growth would occur on agricultural lands under the No Project Alternative. The eight San Joaquin Valley counties that participated in the San Joaquin Valley Blueprint planning process developed a forecast of farmland conversion to nonagricultural uses by 2050 based on current development patterns. Given continuation of these patterns, 327,000 acres of farmland would be converted by 2050 (San Joaquin Valley Regional Planning Agencies 2009). Because of the extent and quality of farmland in these counties, most of this growth is likely to occur on Important Farmlands⁴. Most development in the southern San Joaquin Valley that is currently being planned or permitted is located in the vicinity of urban centers and/or along SR 99. Most of this development would take place on currently unincorporated county land that is largely classified as Prime Farmland⁵. A total of approximately 5,100 acres of farmland would be converted to nonagricultural uses by development planned or permitted within 2 miles of the Fresno to Bakersfield Section alternatives by 2035.

The No Project Alternative would not cause or accelerate substantial physical deterioration of parks, recreation, and open space resources. Continuing the pattern of converting farmland to development, the No Project Alternative would increase the loss of rural views while resulting in

⁴ Important Farmland is Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance identified by the California Department of Conservation.

⁵ Prime Farmland has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops when treated and managed, including water management, according to current farming methods.

limited improvement to the generally moderate to moderately low visual quality in proposed redevelopment areas.

Under the No Project Alternative, cultural resources would continue to be affected in the San Joaquin Valley urban areas through the development of land resulting from growth. Changes in land use, and ground disturbance associated with other transportation infrastructure improvements will occur with the expansion of existing highways to accommodate the state's growing population. Adverse effects on eligible resources could result in the loss of historic properties.

Fresno and Bakersfield land use plans encourage infill and higher-density development in urban areas and concentration of uses around transit corridors to provide more modal choices for residents and workers. The San Joaquin Valley Blueprint identifies the HST as a critical element in meeting the goal of increased urban densification, and the No Project Alternative would conflict with this goal. Under the No Project Alternative, cities would have a more difficult time reducing low-density sprawl and encouraging higher-density development, and fewer modal choices would be available.

Construction of planned development and transportation projects, including the expansion of SR 99, would generate short-term construction employment in the region and a small number of long-term permanent jobs to maintain new and expanded facilities. Under the No Project Alternative, fewer business and employment opportunities would exist in comparison to the HST alternatives. Employment growth would continue to follow existing patterns and would attract fewer of the higher-wage jobs in the financial, insurance, and real estate sectors than would occur under the HST alternatives.

S.9 HST Alternatives Evaluation

The following section provides an overview of the effects, including benefits common to all HST alternatives and proposed mitigation, and compares differences between the impacts and costs of the 11 alternative alignments and the HMF alternatives. Table S-1 provides a high-level comparison of key design features associated with each of the alternative alignments being carried forward. This section then presents discussions of the impacts that differentiate the alternatives (and proposed mitigation measures) and the HMF alternatives (and proposed mitigation measures), as well as cost estimates for each alternative.

Table S-1
Design Features of Alternatives Carried Forward^{a,e}

Design Option	BNSF	Hanford West Bypass 1	Hanford West Bypass 1 Modified	Hanford West Bypass 2	Hanford West Bypass 2 Modified	Corcoran Elevated	Corcoran Bypass	Allensworth Bypass	Wasco-Shafter Bypass	Bakersfield South	Bakersfield Hybrid
Total Length ^b (linear miles)	117 ^d	28(30)	28(30)	28(30)	28(30)	10(10)	10(10)	21(21)	21(22)	12(12)	12(12)
At-grade Profile ^b (linear miles)	76	23(20)	22(20)	22(20)	20(20)	2(6)	7(6)	18(18)	17(11)	2(2)	2(2)
Elevated Profile ^b (linear miles) (including Retained Fill)	40	5(10)	4(10)	6(10)	6(10)	8(4)	3(4)	3(3)	4(11)	10(10)	10 (10)
Below-grade Profile ^b (linear miles)	1	0(0)	2(0)	0(0)	2(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Number of Straddle Bents	40	0(0)	0(0)	5(0)	5(0)	0(0)	0(0)	0(0)	17(0)	89(40)	31(40)
Number of Railroad Crossings	9	1(1)	1(1)	1(1)	1(1)	8(1)	1(1)	1(1)	1(1)	3(2)	3(2)
Number of Major Water Crossings	8	2(4)	2(4)	2(4)	2(4)	1(1)	1(1)	2(2)	0(0)	1(1)	1(1)
Number of Road Crossings	192	32(36)	32(36)	29(36)	29(36)	11(10)	12(10)	10(9)	32(26)	49(57)	55(57)
Approximate Number of Roadway Closures ^c	44	8(7)	8(7)	8(7)	9(7)	2(2)	7(2)	3(3)	20(5)	5(5)	11(5)
Number of Roadway Overcrossings and Undercrossings	48	20(15)	20(15)	18(15)	18(15)	2(2)	4(2)	4(5)	9(9)	1(1)	1(1)

Notes:

^a For comparison, equivalent numbers for the corresponding segment of the BNSF Alternative are presented in parenthesis.

^b Lengths shown are based on equivalent dual-track alignments. For example, the length of single-track elevated structure will be divided by a factor of 2 to convert to dual-track equivalents.

^c Includes public and private road closures.

^d The distance between project limits in Fresno and Bakersfield is 114 miles. The distance between the northern project limit at the northern end of the Fresno Station tracks and Oswell Street in east Bakersfield is 117 miles. The environmental analysis extends to Oswell Street.

^e This table is revised to reflect the refined project footprint in the Final EIR/EIS.

S.9.1 HST Benefits

Of the 8,400 daily riders who would board the HST at the Downtown Fresno Station in 2035, approximately 84% would have otherwise taken an automobile trip to their destination. Overall, the HST project would reduce daily VMT by 11% in Fresno County, 15% in Kings County, 5% in Tulare County, and 10% in Kern County, resulting in the benefits of decreased fuel consumption, decreased congestion, improved travel time, and reductions in air pollution emissions. The HST also would reduce the demand and substitute for commercial air travel within California.

Although the HST project would increase electricity consumption compared to the No Project Alternative, the HST project would reduce vehicle and air travel miles with corresponding reductions in fuel consumption and air emissions, for a substantial net reduction in emissions. In addition, the State of California requires that an increasing fraction (33% by 2020) of the electricity generated for the state's power portfolio come from renewable energy sources. As such, the emissions generated for powering the HST System are expected to be lower in the future than the estimates included in this Final EIR/EIS. The Authority has adopted a policy goal to purchase all HST System power from renewable energy sources, which would result in a greater overall reduction in emissions from the HST project.

The HST stations in Fresno and Bakersfield would have the benefit of encouraging high-density, transit-oriented development in these cities, and would reduce the attractiveness of development on the edges of planned urban areas (i.e., urban sprawl) in these cities. The Kings/Tulare Regional Station alternatives are located outside of the urban center of Hanford in unincorporated Kings County. These station sites are on the urban fringe of the City of Hanford, and land uses surrounding the sites are predominantly agriculture and low-density residential development. Kings County and the City of Hanford envision the lands on the east side of Hanford to remain predominantly in agricultural use. The long-range vision for land use on the west side of Hanford is predominantly low-density residential development. The Authority would work with the City of Hanford and Kings County to develop plans to protect land from urban development around the alternative Kings/Tulare Regional Station sites, including acquisition of agricultural conservation easements in the station vicinity, to the extent practical when dependent upon willing sellers, and limiting parking at the station to promote the use of transit between the station and local communities.

The HST project could improve water quality in Fresno and Kern counties compared with the No Project Alternative because of decreased VMT and the encouragement of transit-oriented development, which in turn would reduce non-point source pollutants through trip reduction and increased density. The HST project may induce slight population and employment growth throughout the region, including growth in the communities that would not have an HST station. Indirect impacts would increase employment opportunities and economic vitality throughout the region, a result not likely under the No Project Alternative. Under current city and county general plans, communities in the region have adopted urban growth boundaries to accommodate growth beyond the 2035 planning horizon, including any growth induced by the HST project. HST-induced growth would therefore not require farmland conversion beyond what is currently planned for conversion. Generally, low-income and minority populations reside throughout the Fresno-to-Bakersfield corridor; therefore, benefits such as improved mobility, air quality, and employment would accrue to these low-income and minority populations because they compose such a large percentage in the region.

The analysis of all HST alternatives determined that by applying required federal and state regulations and engineering criteria standards, the operation of the project would not have substantial effects on public utilities and energy; geology, soils, and seismicity; hazardous materials and wastes; and hydrology and water resources.

S.9.2 Adverse Effects Common to All HST Alternatives

The following potentially significant impacts would occur with all HST alternatives. The impact analysis takes into account project design features and the implementation of regulatory requirements, both of which would reduce impacts from implementing the project prior to application of mitigation measures.

Tables S-2 and S-3 show the differences among the alternatives, along with the associated mitigation measures for these impacts. Section S.8.3, Comparison of Alternatives, describes these differences.

- **Transportation:** The project would grade-separate many existing at-grade crossings of the BNSF Railway between Fresno and Bakersfield, benefiting traffic safety and circulation. Project operation would increase traffic congestion at numerous intersections around the Fresno, Kings/Tulare Regional, and Bakersfield stations. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Mitigation measures for operational impacts include a wide variety of roadway improvements including restriping, installation of signals, modification of signal timing, and roadway widening. Following mitigation, the traffic effects at all intersections would not be significant under NEPA, and the impact would be less than significant under CEQA. However, effects on the local circulation would occur in the congested areas of the cities of Fresno and Bakersfield from the extension of the duration of peak periods of congestion; the effect of this increased congestion would be considered significant under NEPA and the impact would be less than significant under CEQA.

All HST alternatives would result in permanent road closures in urban and rural areas. The Authority would provide suitable access for property owners affected by these road closures; therefore, the effect of road closures would not be significant under NEPA, and the impact would be less than significant under CEQA. In the rural areas, the roads proposed for closure have very low traffic volumes and necessary traffic diversions can be accomplished without causing effects to be a moderate intensity under NEPA and less than significant under CEQA. Where these impacts would occur in the congested urban areas of the cities of Fresno and Bakersfield, which could extend the duration of peak periods of congestion, these project impacts are considered to be significant under NEPA and less than significant under CEQA.

Potential construction-related cumulative impacts on transportation would be similar for all HST alternatives. All of the alternatives require similar construction techniques, including temporary road closures and delays, but at different locations; avoidance and minimization measures to reduce these delays would be applicable to all alternatives. The cumulative effect of project construction on travel delay would not be significant under NEPA, and is not cumulatively considerable under CEQA.

Potential operations-related cumulative impacts on transportation would be similar for all HST alternatives because of the regional nature of the analysis and because benefits would be realized at a regional level. Specific local impacts, such as road closures and crossings, would also be similar because all HST alternatives affect similar transportation facilities. At a local level, the project in combination with other past, present, and reasonably foreseeable projects would decrease the level of service on some roadway segments and at intersections in the vicinity of HST stations; however, incorporated project mitigation measures would ensure operating conditions would not decrease below LOS D. Therefore, the cumulative operation impacts would not be significant under NEPA and would not be cumulatively considerable under CEQA.

- **Air Quality and Global Climate Change:** The San Joaquin Valley does not meet National Ambient Air Quality Standards (NAAQS) or California Ambient Air Quality Standards (CAAQS) for ozone and particulate matter (particles) less than 2.5 micrometers ($PM_{2.5}$), and does not meet CAAQS for particulate matter (particles) less than 10 micrometers (PM_{10}). Fresno and Bakersfield are maintenance areas under NAAQS for carbon monoxide (CO). Project construction for all HST alternatives would result in substantial emissions of ozone precursors (volatile organic compounds [VOC] and nitrogen oxides [NO_x]) and CO. Prior to mitigation, project construction for all HST alternatives would also conflict with regional attainment plans and exceed CEQA significance thresholds for VOC and NO_x , PM_{10} , and $PM_{2.5}$. Implementation of mitigation measures, including entering into a Voluntary Emissions Reduction Agreement (VERA) with the San Joaquin Valley Regional Air Pollution Control District (SJVAPCD) would reduce construction-related criteria pollutant emissions to net zero. Therefore, construction air quality impacts from criteria pollutant emissions would not be significant under NEPA and the impact would be less than significant under CEQA.

Localized impacts on sensitive receptors within 1,000 feet of the guideway/alignment construction would not be significant under NEPA and the impact would be less than significant under CEQA because the cancer risk from emissions would be less than 10 in a million and the non-cancer hazard index would be less than 1. Health risk assessments of construction emissions for sensitive receptors near station construction sites, concrete batch plant operations, and HMF/maintenance of way facility (MOWF) construction sites also found the cancer risk to be less than 10 in a million and the non-cancer hazard index to be less than 1. Therefore, localized impacts to sensitive receptors from construction of these facilities would not be significant under NEPA and the impact would be less than significant under CEQA.

Air quality construction impacts associated with the HST project would be above the SJVAPCD's significance thresholds for regional criteria pollutants and together with other past, present, and foreseeable future projects would be cumulatively considerable before mitigation; however, with implementation of the mitigation measures identified in Section 3.3.9, the project's emissions would be net zero with offsets. Therefore, consistent with the SJVAPCD's Guidance for cumulative impacts analysis, the HST alternatives' contribution to cumulative construction air quality impacts after mitigation would not be significant under NEPA and would not be cumulatively considerable under CEQA.

Project operations for all HST alternatives would result in a net benefit to air quality because the HST project would result in lower mobile source air toxics (MSATs), greenhouse gas (GHG), VOC, NO_x , CO, PM_{10} , and $PM_{2.5}$ emissions compared with the No Project Alternative. There would be no CO or PM hot spots during project operations. Additionally, the project operations would lead to only localized dust impacts up to 10 feet from the train, which would become negligible beyond this distance. Operation of the HMF/MOWF could expose sensitive receptors within 1,300 feet to substantial toxic air contaminant concentrations prior to mitigation. Mitigation of this operational impact includes locating emission sources within the HMF/MOWF property away from possible sensitive receptors and using best industry practices or alternative equipment to reduce emissions. The air quality effect for toxics of HMF/MOWF emissions at all HMF/MOWF sites would not be significant under NEPA, and the impact would be less than significant under CEQA following mitigation.

The operation of the HST alternatives would reduce regional VMT and consequently reduce ROG, NO_x , PM_{10} , and $PM_{2.5}$ emissions. Therefore, on the whole, the operation of the HST alternatives would have a beneficial impact under NEPA and a less than cumulatively considerable contribution under CEQA. Because the HST alternatives would result in a net reduction in CO_2 emissions, the project effects on greenhouse gas emissions would have a

cumulative beneficial contribution under NEPA and a less than cumulatively considerable contribution under CEQA.

- **Noise and Vibration:** All HST alternatives would create noise impacts during construction. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Mitigation for these impacts includes noise monitoring during construction and requiring the contractor to implement one or more noise control measures to meet noise limits. The Authority will mitigate temporary impacts; therefore, the effects of construction noise would not be significant under NEPA, and the impacts would be less than significant under CEQA.

Building damage from construction vibration is only anticipated from impact pile driving very close to buildings and impacts would be of a moderate intensity. Damage from construction vibration is not anticipated if pile driving takes place more than 25 to 50 feet from buildings, or if alternative methods such as push driving or augur installation can be used. Mitigation includes preconstruction surveys to document the existing condition of buildings located within 50 feet of pile installation and using methods other than a hammer to install piles close to buildings that could be damaged by vibration. Therefore, it is expected that impacts of construction vibration would not be significant under NEPA and less than significant under CEQA.

All HST alternatives would create operational noise impacts. No sensitive vibration receivers would be impacted by project operations. Slab track was assumed to be 3 decibels louder than ballast and tie track; therefore, slab track may result in additional noise impacts. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Mitigation for operational noise includes the installation of sound barriers, vehicle noise specification, special trackwork at crossovers and turnouts, and additional noise analysis during final design. In some locations, operational noise impacts would be significant under NEPA and CEQA, but where fully mitigated, the effect would then not be significant under NEPA and less than significant under CEQA.

All HST alternatives would have similar potential cumulative impacts on noise and vibration. The cumulative noise and vibration impacts of the HST alternatives and other past, present, and reasonably foreseeable projects during construction would be significant under NEPA and would be cumulatively considerable under CEQA. Operations-related impacts of the HST alternatives would have a substantial intensity because of the large number of sensitive receivers along these corridors. The project's incremental contribution to the significant cumulative noise impact would be significant under NEPA and cumulatively considerable under CEQA.

- **EMF/EMI:** Under all HST alternatives, HST workers with implanted medical devices exposed to EMF at electrical facilities, such as traction power facilities could have health effects of a substantial intensity. The Electromagnetic Compatibility Program Plan would implement a safety program that would educate workers with implanted medical devices to the EMF hazards from entering any facility with electrical equipment that could endanger them and exclude them from entering such facilities. Therefore, the EMF impact on workers would be avoided and there would be no impact under NEPA and CEQA. The Bakersfield South and Bakersfield Hybrid alternatives could cause electromagnetic interference with medical equipment at three potentially sensitive receptors adjacent to Mercy Hospital in Bakersfield and would have a substantial intensity under NEPA and be a significant impact under CEQA. This impact would be mitigated through design provisions to prevent interference, such as establishing RF-resistant walls around sensitive equipment or installing RF filters in sensitive equipment. Following mitigation, the project would have no EMF/EMI impacts under NEPA and CEQA.

There are no cumulative impacts related to electromagnetic fields (EMFs) and electromagnetic interference (EMI) because none of the identified past, present, or reasonably foreseeable projects have EMF impacts. There would be no cumulatively considerable impacts from any of the HST alternatives.

- **Public Utilities and Energy:** For all alternatives, project construction would conflict with existing underground and aboveground utilities and could result in scheduled service interruptions. Construction activities would also generate solid and hazardous waste through the demolition of existing roads and buildings. With advanced notice of utility interruption and adequate capacity at landfills, utility interruptions and increased waste generation would have negligible intensity under NEPA. Impacts to utilities are considered not to be significant under NEPA, and impacts would be less than significant under CEQA. The Hanford West Bypass 1 and Hanford West Bypass 1 Modified alternatives would conflict with ancillary components adjacent to an electrical substation. The intensity of this effect would be moderate under NEPA, and the impact would be significant under CEQA. Mitigation to reconfigure ancillary components of electrical substations would decrease the effect so that it is not significant under NEPA, and decrease impacts to less than significant under CEQA.

The alternative alignments for the Fresno to Bakersfield Section cross electrical transmission lines that can be tapped at the HST right-of-way to provide power for this section of the HST System. However, power providers may need to reconstruct or reconductor (i.e., replace power lines on existing poles) these transmission lines. When electrification of the system is engineered, PG&E would assess the need to alter the existing transmission lines.

Potential cumulative impacts from both construction and operation on public utilities and energy would be similar for all HST alternatives. The cumulative impact of the HST alternatives and other past, present, and other reasonably foreseeable projects on public utilities and energy during construction and operation would not be significant under NEPA and would not be cumulatively considerable under CEQA.

- **Biological Resources and Wetlands:** Construction of the HST alternatives could introduce invasive (noxious) weeds; would directly and indirectly effect species that are rare or protected under state and/or federal law (special-status species), including plants, wildlife, and remove suitable habitat that has the potential to support special-status species; convert substantial acreage of native habitat including annual grasslands, alkali desert scrub, and riparian areas; reduce the functionality of wildlife corridors and linkages; and trim or remove trees protected by local ordinances. Operation of the project would permanently impact suitable habitat for special-status plant and wildlife species; permanently impact special-status plant communities and jurisdictional waters; impact U.S. Fish and Wildlife Service (USFWS) recovery plans for threatened or endangered species; remove protected trees; and reduce the functionality of wildlife movement corridors and linkages.

Construction and project period common mitigation measures that avoid and/or minimize impacts on all biological resources and wetlands include monitoring, worker awareness training, weed control, implementing a biological resources management plan, implementing a restoration and revegetation plan, identification of environmentally sensitive areas and environmentally restricted areas, installation and use of approved fencing, and compliance reporting. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Construction period mitigation measures to avoid or minimize impacts on biological resources include: mapping special-status plants species and communities to avoid, protocol and/or preconstruction surveys of special-status wildlife species, construction timing, and implementation of resource specific guidelines and/or restoration of habitats and monitoring. Mitigation for impacts during project operation include coordinating with the regulatory agencies (i.e., USFWS, U.S Army Corps of Engineers

[USACE], California Department of Fish and Wildlife [CDFW]); compensating for impacts on special-status plant species and plant communities; compensating for impacts on special-status wildlife species; implementing agency-approved guidelines and a habitat mitigation and monitoring plan; and compensating for impacts on jurisdictional waters. Following mitigation, biological impacts would not be significant under NEPA and the impacts would be less than significant under CEQA.

When comparing HST alternatives, only the Allensworth Bypass Alternative and the corresponding segment of the BNSF Alternative would have substantial differences in potential cumulative impacts on biological resources. The BNSF Alternative would have a greater potential for cumulative impacts on biological resources, including high quality jurisdictional waters (i.e., vernal pools), the Allensworth Ecological Reserve, and wildlife movement corridors, than the Allensworth Bypass Alternative. Other HST alternatives would have cumulative biological resource impacts similar to those of the corresponding segment of the BNSF Alternative. Mitigation for the project includes restoration, enhancement, and preservation of jurisdictional waters and riparian habitats to the extent that there will be no net loss of aquatic resources, functions, and services. These habitats are important for many special-status plant and wildlife species. Also, project mitigation includes preservation of habitat occupied by special-status plant and wildlife species. Much of this preservation would occur in important wildlife movement corridors. This preservation in combination with the restoration, enhancement, and preservation of jurisdictional waters will improve biological resources in the region over existing conditions. For these reasons, the HST project will not contribute to cumulative biological impacts in the region.

- **Hazardous Materials and Wastes:** Construction of all HST alternatives could result in accidents or spills of hazardous materials and wastes that could affect sites of potential environmental concern, which would result in temporary hazards to schools. During project construction, the handling of extremely hazardous materials within 0.25 mile of a school would be avoided by prohibiting contractors from using extremely hazardous substances or a mixture thereof in a quantity equal to or greater than the state threshold quantity (Health and Safety Code Section 25532) within 0.25 mile of a school. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Mitigation would reduce the effect of the use of hazardous materials and generation of hazardous wastes to a negligible intensity and impacts would not be considered significant under NEPA. Impacts would be less than significant under CEQA.

During operation only minor amounts of hazardous materials would be used; therefore, the risk of an accidental spill resulting in an uncontrolled release of hazardous materials into the environment would be negligible. Implementation of regulatory requirements would reduce the potential for hazardous materials released from an accidental spill to enter the environment. For these reasons, this impact would not be significant under NEPA and the impact would be less than significant under CEQA.

Potential cumulative impacts of hazardous materials and wastes would be similar among all HST alternatives during both construction and HST operation. Compliance with regulatory requirements for hazardous materials would minimize the risk of releases and exposure to hazards and would reduce potential impacts from projects constructed and operated under the cumulative condition. Therefore, the cumulative impacts on hazardous materials of the HST alternatives and past, present, and reasonably foreseeable projects would not be significant under NEPA and would not be cumulatively considerable under CEQA.

- **Safety and Security:** All HST alternatives could increase demand for local emergency responders around the stations due to station activity and associated redevelopment and economic activity. This could increase response times and require new or physically altered

government facilities that might impact the environment. This effect could have a moderate intensity under NEPA, and a significant impact under CEQA. As mitigation, emergency response to station and HMF incidents would be monitored, and if determined that the HST project does result in increased demand, a fair share impact fee to local service providers would be negotiated, reducing effects to negligible intensity under NEPA. Therefore, impacts would not be significant under NEPA and impacts would be less than significant under CEQA.

Potential cumulative impacts on safety and security would be similar for all HST alternatives. Because construction of the HST alternatives would only contribute a temporary increase in emergency response times and, as part of the project design, the Authority would develop a construction transportation plan with local jurisdictions to minimize project effects on emergency response times, the project's contribution to cumulative safety and security impacts would not be significant NEPA and would not be cumulatively considerable under CEQA.

Past, present, and foreseeable projects would increase demand on emergency services as a result of projected population increases. The HST alternatives would increase the number of people at station locations, cumulatively contributing to this demand on emergency services. Because development projects are required to pay impact fees that support capital costs for new or expanded government facilities and the design and operation of the HST minimizes the need for emergency services, there would be no significant cumulative effect under NEPA and the project contribution to cumulative impacts on emergency services would not be cumulatively considerable.

- **Socioeconomics and Communities:** Project construction spending for all alternatives would result in sales tax revenue gains and an increase in employment. The sales tax revenue generated would benefit local government revenues and the additional jobs would benefit the regional employment base in the San Joaquin Valley. Construction activities could affect sales prices of nearby properties and result in lower property tax revenues. This would have an effect of moderate intensity under NEPA. The current context of the region is one of challenging budget deficits for local county and city jurisdictions. Given this moderate intensity and context, the overall impact on property tax revenues would be significant for the duration of construction.

The impacts of noise, dust, visual changes, and changes in traffic patterns would not affect overall community integrity but would affect quality of life in the communities surrounding project construction zones. All of the alternatives would result in effects of moderate intensity on community interactions during construction. The context of these communities varies from urban settings, where construction can be a common occurrence, to rural settings, where such a construction project would be in stark contrast to existing conditions. Given this moderate intensity and context, the overall impact would be significant under NEPA for the duration of construction.

Adverse effects of project operation include the potential to divide adjacent communities by physically removing homes, businesses, and community facilities and placing a new linear project through the community outside of and away from the existing railroad right-of-way. The intensity of this effect would be substantial for several small, unincorporated communities along the alternative alignments (e.g., Ponderosa Road east of Hanford, Newark Avenue northeast of Corcoran, 5th Avenue and Waukena Avenue east of Corcoran, and Crome between Shafter and Bakersfield), as well as in the affected neighborhoods of Bakersfield, where right-of-way acquisition would divide communities and disrupt community facilities, such as the Mercado Latino Tianguis, Bakersfield High School, a Mercy Hospital medical complex building, and several religious facilities. The impact to these communities would be significant under NEPA and CEQA.

Residential relocation effects of substantial intensity associated with the BNSF, Bakersfield South, and Bakersfield Hybrid alternatives would occur in Corcoran and the Bakersfield Northwest and Northeast districts. Effects of moderate intensity from residential displacements would occur in unincorporated Fresno, Kings, and Kern counties from the BNSF Alternative and in Armona from the Hanford West Bypass 1 and Hanford West Bypass 1 Modified, Hanford West Bypass 2, and Hanford West Bypass 2 Modified alternatives. Commercial and industrial business displacements and required relocations associated with the BNSF, Bakersfield South, and Bakersfield Hybrid alternatives would result in effects of substantial intensity in Corcoran and the Bakersfield Central and Northeast districts. Commercial and industrial business relocations required under the BNSF Alternative and the Fresno HMF site in Fresno's Edison and Roosevelt districts would result in effects of moderate intensity. The regional context is one where established neighborhoods in urban and rural communities would be disrupted and displaced commercial and agricultural businesses have great importance to the local economies. Given this substantial intensity and context, the overall impacts would be significant under NEPA.

Operation of the HST System for all alternatives would result in economic benefits to the region, including long-term increases in property and sales tax revenues as a result of improved accessibility to statewide labor and customer markets. The direct jobs created to operate and maintain the project, indirect and induced jobs created to support these new workers, and the additional jobs created as a result of the improved connectivity of the region to the state would result in a net benefit in regional employment. Some short-term reductions in property and sales tax revenues may occur as a result of land acquisition and the removal of properties from county tax rolls. A reduction in tax revenues has the potential to affect school district funding. As most residences and businesses would have the opportunity to relocate within the same tax jurisdiction and the potential losses would be a small percentage of annual tax revenues collected by local jurisdictions, the intensity of the effect would be negligible. In the context of a challenging regional economic climate, the impact would less than significant under NEPA. The intensity of effects on agricultural production as a result of project land acquisition would be moderate in the short term and negligible in the long term, as farm operations logically reallocate land resources and relocate agricultural facilities. Given the regional context of a productive agricultural economy, the impact would be less than significant in the long term under NEPA.

Construction and operation of the HST project and other past, present, and reasonably foreseeable projects would result in a significant cumulative impact under NEPA and CEQA due to division and/or disruption of communities in the cities of Fresno, Hanford, Corcoran, Wasco, Shafter, and Bakersfield, as well as unincorporated communities in Kings and Kern counties. The project's incremental contribution to this impact would be significant under NEPA and cumulatively considerable under CEQA.

The construction of the HST project and other past, present, and reasonably foreseeable projects would result in a cumulatively beneficial impact on the regional economy under NEPA and the contribution of the HST project would be beneficial.

- **Environmental Justice:** Many minority and low-income populations reside in the urban areas of Fresno, Corcoran, Wasco, Shafter, and Bakersfield where other reasonably foreseeable construction projects will also occur, there are likely to be disproportionately high and adverse cumulative construction effects experienced by these populations. Mitigation measures that will be implemented will not completely eliminate the adverse impacts to the low-income and minority populations and when considered with other reasonably foreseeable projects in the area, these populations are likely to bear a disproportionate burden of the cumulative construction period impacts. During project operation, despite the project benefits experienced by low-income and minority populations including the improvement in regional

air quality, a reduction in traffic congestion, and long-term regional economic benefits, some of those communities concentrated in urban areas along the project route including Fresno, Corcoran, Wasco, Shafter, and Bakersfield, as well as in rural areas such as Newark Avenue, 5th Avenue, and Waukena Avenue in the Corcoran area, and Crome would still bear disproportionately high and adverse project period impacts. These impacts would include an increase in both ambient noise levels and vibratory impacts above standards; disruption of communities and the displacement of community facilities; changes or loss of park resources; decreases in visual quality; and cumulative impacts for noise and vibration, communities, and aesthetics and visual resources.

- **Station Planning, Land Use, and Development:** All 11 project alignment alternatives would result in permanent conversion of land in other uses to transportation-related uses. Regardless of the alignment alternative selected for the project, approximately 30% of the land that would be permanently used for the HST tracks and supporting facilities (e.g., traction power and communication systems) is currently in similar uses (i.e., rights-of-way and transportation) or is vacant land; 60% is in agricultural uses; and about 10% is in residential, commercial, and industrial uses.

Although the project would require acquisition of land that is not currently in transportation uses, it would not change existing adjacent land uses except possibly at the Kings/Tulare Regional Station alternative sites. The HST tracks and supporting facilities would not inhibit continuation of existing uses on adjacent lands, nor would they induce growth. Therefore, the project effect on land use would not be significant under NEPA.

For about 31 miles the BNSF Alternative is not adjacent to existing railroad tracks, resulting in a change in the intensity of land use that is incompatible with adjacent land uses. The Corcoran Bypass, Allensworth Bypass, and Wasco-Shafter Bypass cross lands used for agriculture. These alternatives would substantially increase the intensity of the use of the land and would not be compatible with adjacent land uses. The Kings/Tulare Regional Station alternatives would also be located on land used primarily for agriculture. Conversion of this land would substantially change the intensity and pattern of land uses, and would be incompatible with adjacent land uses. For these reasons, the land use impact of the project would be significant under CEQA.

Under the cumulative condition, project-specific mitigation measures, regulations, and best practices pertaining to construction equipment emissions, dust, traffic, noise and vibration, and lighting and glare would reduce potential project construction impacts to land uses. In addition, these impacts would be temporary in duration. Therefore, the cumulative construction period impacts to land use would not be significant under NEPA and would not be cumulatively considerable under CEQA.

The HST alternatives would result in the permanent conversion of land to transportation uses, which in many locations would be incompatible with existing land uses. Although the amount of land affected by the conversion of uses under the HST alternatives would be a relatively small percent of the four-county study area (approximately 4,100 acres, or less than 0.01%), there is the potential for significant land use incompatibilities to occur.

Overall, the cumulative condition would result in substantial land use impacts under NEPA and significant land use impacts under CEQA because of changes in land use that could result from implementation of the HST alternatives. The HST alternatives' contribution to this impact would be significant under NEPA, and cumulatively considerable under CEQA.

- **Agricultural Lands:** Construction and operation of all alternatives would result in permanent conversion of agricultural land to nonagricultural use. Prior to mitigation, effects

would have substantial intensity under NEPA and impacts would be significant under CEQA. Mitigation of this impact includes preservation of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland and creation of a farmland consolidation program to sell non-economic remnant parcels to neighboring landowners. Because farmland cannot be replaced, the effect would continue to be significant under NEPA, and the impact would be significant under CEQA following mitigation.

Potential construction-related cumulative impacts on agricultural lands would be similar for all HST alternatives. Important Farmland would be leased for temporary use as laydown areas, staging areas, and concrete prefabrication yards during construction of the HST alternatives. Construction of other past, present, and reasonably foreseeable projects could also result in the temporary conversion of farmland for construction-related uses. This land would be restored and returned to agricultural use after construction is completed. Therefore, cumulative construction impacts on farmland would not be significant under NEPA and would not be cumulatively considerable under CEQA.

Continuation of current development patterns could result in the conversion of up to an additional 327,000 acres of farmland (San Joaquin Valley Regional Planning Agencies 2009). The project's contribution to the loss of farmland would be cumulatively considerable under any HST alternative. The cumulative effect of conversion of farmland to nonagricultural uses would be significant under NEPA and cumulatively considerable under CEQA.

- **Parks, Recreation, and Open Space:** Construction impacts from the BNSF Alternative would include noise impacts on Father Wyatt Park and McMurtrey Aquatic Center, temporary closure of facilities in the Kern River Parkway and the Mill Creek Linear Park, and noise impacts on Bakersfield High School. The Corcoran Bypass Alternative would avoid impacts on Father Stephan Wyatt Park, and the Bakersfield South and Bakersfield Hybrid alternatives would avoid impacts on Bakersfield High School. The BNSF Alternative, Bakersfield South, and Bakersfield Hybrid alternatives would affect the Kern River Parkway and Mill Creek Linear Park. Before mitigation, effects would have moderate intensity under NEPA, and impacts would be significant under CEQA. After mitigation, the effects would be reduced to a negligible intensity and the impacts would not be significant under NEPA and less than significant under CEQA.

Operation of all HST alternatives would affect the Amtrak playground in Bakersfield by increasing usage due to an increase in the number of people in the station area. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Mitigation will include financial compensation for increased maintenance requirements; this mitigation would result in a decrease in the intensity to negligible; therefore, impacts to this playground would not be significant under NEPA and less than significant under CEQA. Both the Colonel Allensworth State Historic Park and the Allensworth Ecological Reserve would also be affected by project operations if the BNSF Alternative is implemented. After mitigation the effect on Colonel Allensworth State Historic Park would continue to have substantial intensity and therefore impacts would be significant under NEPA and CEQA with the BNSF Alternative. Both the BNSF Alternative and the Corcoran Elevated Alternative would impact Father Wyatt Park in Corcoran with noise and reduced visual quality. These impacts to Father Wyatt Park would have effects of negligible intensity and impacts would not be significant under NEPA and be less than significant under CEQA.

Past, present, and foreseeable projects would increase demand for and use of parks and recreation facilities in proportion to the population growth in the study area. Because developers of new residential projects would be required to donate parkland as a condition of the entitlement process, the impact of cumulative increased demand on parks and recreation

facilities during the HST operation period would not be significant under NEPA and would not be cumulative considerable under CEQA.

- **Aesthetics and Visual Resources:** All HST alternatives would cause visual disturbance during construction including new sources of light and glare, and visual nuisance. All HST facilities, including sound barriers, would affect visual quality throughout the length of the project. Prior to mitigation, effects would have substantial intensity under NEPA and impacts would be significant under CEQA. Mitigation measures to reduce these impacts include minimizing clearing, preserving existing vegetation, using screens where possible, incorporating design criteria for elevated and station elements that can adapt to local context, planting trees along edges of the right-of-way adjacent to residential areas, installing landscape treatments along HST overcrossings and retained fill elements, designing noise barriers in consideration of visual quality, and screening of traction power system facilities. Following mitigation, views would continue to be blocked by some sound barriers and visual quality would be reduced in Bakersfield by HST elevated structures. In the context of the prevailing character of the landscape units in which they are located, these effects were found to be a significant impact under NEPA and CEQA.

Development of cumulative projects in the vicinity of the Fresno to Bakersfield Section would result in construction activities that would create temporary visual changes from demolition, vegetation removal, construction staging areas, construction lighting, and general construction activities. While these cumulative projects would likely be constructed at various time periods and separated visually throughout the area, they could in some cases have overlapping construction schedules and be located in close proximity. The cumulative visual effect of HST construction activities in combination with other past, present, and reasonably foreseeable future projects would be significant under NEPA and cumulatively considerable under CEQA in areas where multiple construction activities are located in close proximity.

The cumulative development projects identified in the San Joaquin Valley Rural/Agricultural landscape could strongly reduce the visual quality within the study area on an individual project basis, as a result of changes to the landscape that accompany the large-scale conversion of agricultural lands to urban uses. The HST alternatives would contribute to such impacts through introducing prominent visual features, such as at-grade or elevated structures, contact power systems, sound walls, associated road overcrossing structures, and other features that could cause a decline in visual quality. Therefore, the HST alternatives' contribution to cumulative impacts would be significant under NEPA and would be cumulatively considerable under CEQA.

- **Cultural and Paleontological Resources:** All HST alternatives have the potential to cause impacts on historic properties (under Section 106 of the National Historic Preservation Act [NHPA]) and historic resources (CEQA) representing both archaeological and architectural resources, and areas of high paleontological sensitivity. HST alternatives would affect historically significant architectural resources. Mitigation for these impacts includes implementing a resource treatment plan for prehistoric and historic resources developed in coordination with the California State Historic Preservation Officer as well as complying with the mitigation framework outlined in the Section 106 Programmatic Agreement and Memorandum of Agreement for cultural resources protection that have been developed for this project. For paleontological resources, the mitigation includes implementing a paleontological resources monitoring and mitigation plan, and halting construction if paleontological resources are found until they can be evaluated and recorded, as appropriate. Even with mitigation, there would be physical impacts, such as demolition or incompatible alteration to historic properties eligible for the National Register of Historic Places (NRHP) and historical resources defined under Section 15064.5 of the CEQA Guidelines. These direct impacts would be significant because loss of the historic property from its local context or a

modification that affects the property's integrity would render the historic property incapable of conveying its significance. This would be a significant impact under NEPA and CEQA.

Potential construction related cumulative impacts on archaeological and paleontological resources would be similar for all HST alternatives. Potential cumulative impacts on historical architectural resources would be greatest for the BNSF Alternative and the Hanford West Bypass 1 and 2 Alternatives; the other HST alternatives would have generally similar cumulative historical architectural resource impacts.

Continued urbanization and development projected under the cumulative condition could result in exposure and disruption of archaeological and paleontological resources and traditional cultural properties, and removal or damage to historic architectural resources. Therefore, the construction related cumulative impact of the project and other past, present, and reasonably foreseeable projects on cultural resources could result in significant impacts under NEPA and the project contribution to this impact would be cumulative considerable under CEQA.

Operations-related impacts from the HST project and other past, present, and reasonably foreseeable projects could result in indirect significant cumulative impacts to historic architectural resources; however, the HST project is not anticipated to result in such impacts and, if later identified, would reduce any such impacts through the Built Environment Treatment Plan (BETP). The HST's contribution would not be significant under NEPA and would not be cumulatively considerable under CEQA.

S.9.3 Comparison of HST Alignment Alternatives

The BNSF Alternative is a single continuous alignment from Fresno to Bakersfield. The additional 10 alternative alignments considered in this Project EIR/EIS deviate from the BNSF Alternative for portions of the route. There are 108 possible combinations of these alternatives to make a continuous alignment from Fresno to Bakersfield.

Table S-2 at the end of the summary lists those impacts that differentiate each of the 108 project alignment alternatives. There are other environmental impacts associated with the alignment alternatives that are not listed in Table S-2 because they are of similar magnitude among the alternatives and therefore do not provide a means of differentiating between alternatives. Table S-3 at the end of the summary lists all substantial and significant project impacts.

Many regulations require standard measures to avoid and minimize environmental impacts. The Authority will comply with these regulations, and therefore these measures are not summarized here. Table S-3 at the end of the summary presents all of the mitigation measures proposed for the project. In addition, the Authority will strive to avoid and minimize impacts further as design progresses.

The 10 base alternatives that deviate from the BNSF Alternative were developed to reduce the environmental impacts of the HST project. The principal benefits and impacts of these alternatives relative to the BNSF Alternative are discussed below.

The Hanford West Bypass 1 and 2 alternatives would run to the west of the city of Hanford. These alternatives would directly impact more wetland acres than would the BNSF Alternative. The Hanford West Bypass 1 and 2 alternatives would result in the conversion of fewer acres of agricultural lands to nonagricultural uses and fewer impacts on Williamson Act lands than the BNSF Alternative. Because these alternative alignments would pass close to the communities of Grangeville and Armona, there would be slightly more business displacements and a larger number of sensitive noise receivers significantly impacted under these alternatives than under the BNSF Alternative. Also, these alternatives would affect a larger number of historically

significant cultural resources than the BNSF Alternative. The Hanford West Bypass 1 and 2 Modified alternatives would have impacts similar to the Hanford West Bypass 1 and 2 alternatives except they would avoid and minimize impacts to two historic properties protected under Section 106 and Section 4(f) that were impacted by the Hanford West Bypass 1 and 2 alternatives.

The Corcoran Elevated Alternative would have impacts similar to those of the corresponding segment of the BNSF Alternative, since both of these alignments follow the same general corridor through the city of Corcoran. The Corcoran Elevated Alternative would directly impact more acres of waters of the U.S. than the BNSF Alternative. It would result in fewer residential and business displacements than the BNSF Alternative, and would be less disruptive of the roadway network in Corcoran. The Corcoran Elevated Alternative would result in noise impacts on more sensitive receivers (e.g., residences, schools) than the BNSF Alternative and would have a greater visual impact on residents of the community than the BNSF Alternative.

The Corcoran Bypass Alternative avoids the city of Corcoran, deviating from the BNSF Railway. The Corcoran Bypass Alternative would have fewer direct impacts on wetlands than the BNSF Alternative. It would have fewer noise impacts on sensitive receivers, affect fewer low-income and minority communities, cause less community disruption, and result in fewer business displacements than the BNSF Alternative. The Corcoran Bypass Alternative would result in a smaller loss in property tax revenues, a greater loss in agricultural sales, conversion of more agricultural land to nonagricultural uses, and a greater loss of land protected under the Williamson Act than the BNSF Alternative.

The BNSF Alternative would require the acquisition of property from Allensworth State Historic Park and the Allensworth Ecological Reserve. This alternative would also cause visual and noise impacts on the park. The Allensworth Bypass Alternative would avoid these impacts and reduce the acreage of jurisdictional waters permanently affected by the project. However, the Allensworth Bypass Alternative would have a greater property tax revenue reduction, cause more agricultural business impacts, convert more acres of farmland to nonagricultural uses, and affect more acres of Williamson Act land than the BNSF Alternative.

The Wasco-Shafter Bypass Alternative avoids the communities of Wasco and Shafter, while the BNSF Alternative goes through these communities adjacent to the BNSF Railway. The Wasco-Shafter Bypass Alternative would have fewer noise impacts, affect fewer low-income and minority communities, cause less community disruption, and result in fewer residential and business displacements than the BNSF Alternative. The Wasco-Shafter Bypass Alternative would result in a greater loss in agricultural sales, more conversion of agricultural land to nonagricultural uses, and a greater loss of land protected under the Williamson Act than the BNSF Alternative. The Wasco-Shafter Bypass Alternative would affect fewer acres of waters than the BNSF Alternative; however, none of these waters are wetlands. All of the waters in the Wasco-Shafter area consist of man-made features installed in uplands for agricultural purposes, such as irrigation return-flow detention basins and irrigation canals.

The Bakersfield South and Bakersfield Hybrid alternatives would also have impacts similar to those of the corresponding segment of the BNSF Alternative, since these two alternatives are relatively close to the BNSF Alternative as they cross through metropolitan Bakersfield. The Bakersfield South and Bakersfield Hybrid alternatives would directly impact fewer acres of wetlands than the BNSF Alternative. Noise associated with the HST on the Bakersfield South Alternative would affect more sensitive receptors than the corresponding segment of the BNSF Alternative. Noise associated with the HST on the Bakersfield Hybrid Alternative would affect fewer sensitive receptors than the Bakersfield South Alternative and the corresponding segment of the BNSF Alternative. The Bakersfield South and Bakersfield Hybrid alternatives would have EMI impacts on medical equipment in Mercy Hospital. Unlike the BNSF Alternative, the Bakersfield South and Bakersfield Hybrid alternatives would not encroach on the campus of

Bakersfield High School. The Bakersfield South Alternative would have fewer associated residential and business relocations and have a smaller property and sales tax revenue reduction than the corresponding section of the BNSF Alternative. The Bakersfield Hybrid Alternative would displace substantially fewer residential units than either the BNSF or Bakersfield South alternatives, particularly in the Northeastern district of Bakersfield. The Bakersfield Hybrid Alternative would have fewer commercial/business displacements than the BNSF Alternative, but greater commercial/business displacements than the Bakersfield South Alternative because it traverses an area of commercial land uses adjacent to the Edison Highway in East Bakersfield. The loss in property and sales tax revenue with the Bakersfield Hybrid Alternative would be similar to the Bakersfield South Alternative. A greater number of religious facilities would be displaced with the Bakersfield South Alternative than the BNSF Alternative, and fewer religious facilities would be displaced by the Bakersfield Hybrid Alternative than the BNSF and Bakersfield South alternatives. The Bakersfield South Alternative would cross through the Mill Creek Redevelopment Area between the Amtrak station and California Avenue. The BNSF and Bakersfield Hybrid alternatives would be located north of this redevelopment area.

S.9.4 Comparison of HST Stations

The stations analyzed in this Final EIR/EIS include the preferred station in the city of Fresno, two station locations in the vicinity of the city of Hanford, and three stations in the city of Bakersfield. All of the station alternatives are associated with a specific alternative alignment. The Fresno Station at Mariposa Street was selected as the preferred station alternative in the environmental review process for the Merced to Fresno Section of the HST System.

The Kings/Tulare Regional Station–East Alternative is associated with the BNSF Alternative Alignment. The Kings/Tulare Regional Station–West alternatives are associated with the Hanford West Bypass 1 and 2 alternative alignments and Hanford West Bypass 1 and 2 Modified alternative alignments. The Kings/Tulare Regional Station–West on the Hanford West Bypass 1 and 2 alternatives would be located at-grade. The Kings/Tulare Regional Station–West on the Hanford West Bypass 1 and 2 Modified alternatives would be located below-grade. The Kings/Tulare Regional Station–East would result in the conversion of more Important Farmland to nonagricultural use than would the Kings/Tulare Regional Station–West. The Kings/Tulare Regional Station–West would displace more residences and commercial properties than the Kings/Tulare Regional Station–East. The at-grade Kings/Tulare Regional Station–West would have greater noise and visual impacts than the below-grade station.

Each of the three alignment alternatives in Bakersfield would have slightly different station configurations, but all three station alternatives are within a few hundred feet of each other in Downtown Bakersfield near the existing Amtrak station. All three alternatives would have similar impacts.

S.9.5 Comparison of HMF Alternative Sites

As indicated above, five alternative sites were evaluated for an HMF along the Fresno to Bakersfield Section. Table S-4 at the end of the summary provides a comparison of impacts associated with these five sites.

S.9.6 Capital Cost

Table S-2 at the end of the summary provides a cost estimate in 2010 dollars for each of the 108 alignment alternatives. The HMF sites would all contain the same facilities to provide maintenance services for the HST System. The HMF at any of the sites would cost about \$620 million, based on conceptual site and functional layouts for the facilities.

S.9.7 Section 4(f)/Section 6(f)

Section 4(f)

Under Section 4(f) of the U.S. Department of Transportation Act (codified at 49 United States Code (U.S.C.) 303), an operating administration of the U.S. Department of Transportation may not approve a project that uses properties protected under this section of the law unless there are no prudent or feasible alternatives and the project includes all possible planning to minimize harm to such properties. Properties protected under Section 4(f) are publicly owned lands of a park, recreation area, or wildlife and waterfowl refuge or land of a historical site (publicly or privately owned) of national, state, or local significance as determined by the federal, state, regional, or local officials having jurisdiction over the resource.

The following historic property protected under Section 4(f) would incur a use regardless of which alternatives were selected: the Washington Irrigated Colony Historic Rural Landscape, including two of its contributing properties (the Washington Colony Canal and the North Branch of Oleander Canal).

In the Hanford area, all of the project alternatives would result in the use of Section 4(f) resources. Implementation of the BNSF Alternative east of Hanford would result in a use of the Peoples Ditch. Were the Hanford West Bypass 1 and 2 alternatives to be implemented, three Section 4(f) resources would incur impacts: the Last Chance Ditch, 13148 Grangeville Boulevard, and 9860 13th Avenue. Implementation of the Hanford West Bypass 1 and 2 Modified alternatives would result in a use of Last Chance Ditch.

Implementation of the BNSF Alternative would result in a Section 4(f) use of Colonel Allensworth State Historic Park and the Allensworth Ecological Reserve. These uses could be avoided with implementation of the Allensworth Bypass Alternative.

Implementation of all of the alternatives has the potential to result in the use of Section 4(f) properties. All three alternatives appear to result in a *de minimis* impact to the Kern River Parkway and Mill Creek Linear Park. The BNSF Alternative would also use the historic structure at 2509 East California Avenue.

Section 6(f)

Section 6(f) properties are recreation resources funded by the Land and Water Conservation Fund (LWCF) Act. These properties also cannot be used for transportation projects unless there is no prudent or feasible alternative, and their use must be fully mitigated to the satisfaction of the National Park Service and the local jurisdiction administering the recreation resource. Funds from a 1994 LWCF development grant to the California Department of Parks and Recreation were used for new recreational facilities at Colonel Allensworth State Historic Park/Allensworth Historic District. Therefore, this park is considered a 6(f) property. The BNSF Alternative Alignment would require conversion of approximately 1.7 acres of the park. Section 6(f) impacts on the park would be avoided with implementation of the Allensworth Bypass Alternative.

S.10 Areas of Controversy

Based on the scoping meetings and public outreach efforts throughout the environmental review process, the following are known areas of controversy:

- Selection of the preferred HST alternative.
- Impacts on special-status plants and wildlife and wildlife habitat preserves.

- Impacts on corridor communities (including noise, visual quality impacts, loss of community character and cohesion, impacts to low-income and minority populations, and right-of-way acquisition).
- Impacts on farmlands (including severance of farmlands, loss of productive farmland, and loss of agricultural enterprises).
- Trade-offs between corridor communities and agricultural lands.

S.11 Draft EIR/EIS and Revised Draft EIR/Supplemental Draft EIS Circulation and Review

The Fresno to Bakersfield Section Draft EIR/EIS was circulated with a 60-day review period, which closed on October 13, 2011. Several advertised public workshops were held in the project area during the review period to present the Draft EIR/EIS and to give the public an opportunity to ask questions and collect information about the project. Four public workshops were held in late August in Rosedale, Wasco, Corcoran, and Fresno, at which members of the public could review copies of the Draft EIR/EIS and obtain help in identifying how the project might affect their property. Formal hearings were held in Fresno, Hanford, and Bakersfield, and written and verbal comments accepted on September 20, 21, and 22, 2011.

The Draft EIR/EIS was made available for review in several ways. The document was posted on the Authority's web site beginning on August 10, 2011. Printed and electronic copies were made available in 40 libraries and community centers located in Fresno, Clovis, Lemoore, Visalia, Tulare, Corcoran, Wasco, Shafter, Bakersfield, and Delano. Copies were sent to cooperating federal agencies, state-responsible and trustee agencies (including copies sent through the State Clearinghouse), and were available at the Authority's office in Sacramento. DVDs with the Draft EIR/EIS in electronic form were sent, without charge, to all who requested them.

The Fresno to Bakersfield Section Revised Draft EIR/Supplemental Draft EIS was circulated with a 90-day review period, which closed October 19, 2012. Several advertised public workshops were held in the project area during the review period to present the Revised Draft EIR/Supplemental Draft EIS and to give the public an opportunity to ask questions and collect information about the project. Four public workshops were held in mid-August in Rosedale, Wasco, Corcoran, and Fresno, at which members of the public could review copies of the Revised Draft EIR/Supplemental Draft EIS and obtain help in identifying how the project might affect their property. Formal hearings were held in Fresno, Hanford, and Bakersfield and written and verbal comments accepted on August 27, 28, and 29, 2012.

The Revised Draft EIR/Supplemental Draft EIS was made available for review in several ways. The document was posted on the Authority's web site beginning on July 17, 2012. Printed and electronic copies were distributed to the original 40 repository locations in Fresno, Kings, Tulare, and Kern counties, plus an additional eight locations to provide additional means for public review. Copies were sent to cooperating federal agencies, state-responsible and trustee agencies (including copies sent through the State Clearinghouse), and were available at the Authority's office in Sacramento. DVDs with the Revised Draft EIR/Supplemental Draft EIS in electronic form were sent, without charge, to all who requested them.

Chapter 8, Public and Agency Involvement, of this Final EIR/EIS contains a list of all public and agency meetings held to date (Table 8-1), and Volumes IV and V, Response to Comments, contain a summary of comments and responses to these comments, as well as a list of the comments received after the close of the Revised Draft EIR/Supplemental Draft EIS comment period on October 19, 2012. The formal review period did not limit the consideration of comments received from agencies, organizations, and the public after the end of the comment

period. The Authority and FRA considered comments received after October 19, 2012, and reproduced or summarized them in this Final EIR/EIS. Volumes IV and V also include copies of all public and agency comments received during the comment period and responses to these comments.

S.12 Public and Agency Comment Summary

During the comment periods for the draft environmental documents, there were 1,472 comment submittals on the Fresno to Bakersfield Section Draft EIR/EIS, and 783 comment submittals on the Revised Draft EIR/Supplemental Draft EIS. The comments covered a wide range of issues and represented viewpoints from government agencies, organizations, business groups, businesses, residents, and property owners.

Of the 2,255 submittals, 124 generally supported the project and 630 were generally opposed. The other submissions did not specifically state a preference for or against the project. Most comments came from individuals in the general public, living, working, or having property interests in the project study area. Most comments from the public in Kings County indicated that individuals did not want an HST alignment that crossed their county, preferring that the HST be located adjacent to SR 99 and the UPRR or adjacent to I-5. Many members of the public in Kern County requested that the HST alignment avoid Downtown Bakersfield and be located on the outskirts of the city. Commenters from every county crossed by the Fresno to Bakersfield Section expressed interest in the project and looked forward to the additional transportation mode it would provide them, as well as the additional jobs it would bring the region.

Among comments received from the general public, effects on community resources and agricultural and private property were the top concerns about the project. Also, comments expressed concern over the project cost estimates, funding availability (including whether any money should be spent on this type of project in light of state and federal budget deficits), and questions regarding the accuracy of the ridership projections. Common issues also covered safety, noise and vibration, ecosystem effects, neighborhoods, and construction effects.

Affected jurisdictions generally listed their preferences in their comment submittals. The City of Fresno and Fresno County supported the project on the alignment selected through Fresno County. Kings County and the City of Hanford were opposed to an alignment that crosses Kings County. The City of Corcoran does not specifically support any of the three alternatives in or around Corcoran but believes that the alternatives that cross through town would have greater impacts than the Corcoran Bypass Alternative. The City of Shafter supports the BNSF Alternative through Wasco and Shafter and indicated a preference for below-grade crossings for freight at three roads. The City of Shafter also indicates that the Wasco-Shafter Bypass would result in substantial impacts on agricultural operations important to Shafter's economy as well as impacting the City's multimodal freight terminal. The City of Wasco has stated that an alternative through the city must be located on the east side of the BNSF Railway to avoid major impacts on Wasco's economy. The Authority is working with Wasco on mitigation for project impacts to the city. The City of Bakersfield Economic and Community Development Department expressed their interest in an alignment and station on the outskirts of the city. Regional, state, and Federal agencies generally confined their comments to concerns about their resources and the pertinent analysis. This included the U.S. Environmental Protection Agency (U.S. EPA) and USACE. Businesses generally commented on specific property impact issues. Comments were received from 50 special-interest or community organizations representing their environmental or farming interests, the largest of which was Citizens for California High-Speed Rail Accountability.

S.13 Identification of Preferred Alternative

The Preferred Alternative for the Fresno to Bakersfield Section selected by the Authority and FRA combines portions of the BNSF Alternative with the Corcoran Bypass, Allensworth Bypass, and Bakersfield Hybrid. Except for the Hanford and Corcoran areas, the selection of the preferred alignment in any one area (Hanford, Corcoran, Allensworth, Wasco-Shafter, and Bakersfield) is largely independent of the selection process for any of the other areas. The one exception to this is the connection of the Hanford West Bypass alternatives to the Corcoran alternatives. In this case, the Hanford West Bypass 2 alternatives connect to the Corcoran Bypass and the Corcoran Elevated alternatives, and the Hanford West Bypass 1 alternatives connect to the BNSF Alternative through Corcoran. It was necessary to have two slightly different Hanford West Bypass alignments to connect to all of the Corcoran alternatives because of the geometric constraints of an HST alignment. In the Hanford and Corcoran areas, the BNSF Alternative east of Hanford (BNSF Hanford East) in combination with the Corcoran Bypass Alternative was selected as the Preferred Alternative because this alignment has the fewest total direct impacts on waters of the U.S. and riparian habitat of any of the possible alternative combinations in the Hanford and Corcoran region, it is consistent with long-term development plans for the region, it has less cost uncertainty than the Hanford West Bypass alternatives, and an alignment and station east of Hanford would also capture a larger regional population of travelers than an alignment and station west of Hanford. In the Allensworth area, the Allensworth Bypass was selected for the Preferred Alternative because it affects the fewest acres of wetlands, natural habitat, and farmlands, and unlike the BNSF Alternative through Allensworth, it does not permanently incorporate portions of the Allensworth State Historic Park and the Allensworth Ecological Reserve, both of which are Section 4(f) properties; it also does not displace residential units. In the Wasco-Shafter area, the BNSF Alternative through these communities was selected for the Preferred Alternative because of strong regional interests, and consistency with the long-term development plans in Shafter. Also, the cost uncertainties associated with constructing the project in an existing and developing oil field outweigh any reasons to deviate from the existing transportation corridor in the Wasco-Shafter region. The Bakersfield Hybrid Alternative was selected for the Preferred Alternative because it would impact the fewest acres of waters of the U.S. Along with the Bakersfield South Alternative, it would impact the fewest religious facilities, cause the fewest residential displacements, and would not impact the Bakersfield High School campus or Bethel Christian School.

The capital cost estimates for all the possible alternatives for the Fresno to Bakersfield Section ranged from about \$6.9 billion to \$8.1 billion (2010 dollars). The capital cost estimate for the Preferred Alternative is \$7.1 billion.

To meet the legislated travel time requirement for express trains between San Francisco and Los Angeles, the allotted travel time between Fresno and Bakersfield is 37 minutes. The travel time for all the possible alternatives for the Fresno to Bakersfield Section ranged from 30 minutes and 29 seconds to 35 minutes and 32 seconds. The Preferred Alternative would take 34 minutes and 5 seconds to travel between Fresno and Bakersfield, and it would add an additional minute to the Bakersfield to Palmdale Section because of the geometric curves in the Bakersfield Hybrid portion of the alignment. Even at this slower speed in Bakersfield, the Preferred Alternative would operate well within the optimal express train travel time for the Fresno to Bakersfield Section.

The preferred station for the city of Fresno is on Mariposa Street. The choice of this station alternative provides the best opportunity for enhancement of land use densities consistent with the city's current planning for transit-oriented development in the draft Fulton Corridor Specific Plan and the draft Downtown Neighborhoods Plan (City of Fresno 2010). Stations in the Kings/Tulare area and in Bakersfield were selected because they lie on the preferred HST alternative alignments in those locations.

Because only one HMF site will be required for the HST System and that site may be located in adjacent project sections, it is premature to identify a Preferred Alternative HMF site at this time. The HMF decision can be made separately from the identification of the preferred alignment and station alternatives in this Fresno to Bakersfield EIR/EIS.

S.14 Next Steps in the Environmental Process

Notices of availability of the Final EIR/EIS were published, and the document was distributed and made available to agencies and the public on (date pending). Before the Authority and FRA make decisions regarding the project, CEQA and NEPA require that each lead agency make specific findings and determinations regarding the project alternatives, potential impacts, mitigation measures, and conformance with specific environmental laws. Using these findings and determinations, and considering the entire Administrative Record that includes comments received on the Final EIR/EIS, the Authority will prepare a CEQA decision document and FRA will prepare a NEPA decision document approving the completion of the environmental review process and selecting the project alternative to be implemented. In making its decision, the Authority Board will consider whether to certify the Final EIR/ EIS, decide whether to approve the project, make the related Decision, and issue the Notice of Determination. FRA will make its decision through a Record of Decision (ROD).

S.14.1 FRA Decision-Making

On completion of the environmental process with publication of the Fresno to Bakersfield Section Final EIR/EIS, the FRA expects to issue an ROD for compliance with NEPA. The ROD will describe the project and alternatives considered, describe the selected alternative, and identify the environmentally preferable alternative; make environmental findings and determinations with regard to air quality conformity, Endangered Species Act, Section 106, Section 4(f), and environmental justice; and require mitigation measures.

S.14.2 U.S. Army Corps of Engineers Decision-Making

The Fresno to Bakersfield Section of the HST System will require a permit from the USACE under Section 404 of the Clean Water Act and Section 14 of the Rivers and Harbors Act (33 U.S.C. 408). The USACE is using the Fresno to Bakersfield Section EIR/EIS to integrate the procedural and substantive requirements of NEPA and its permitting responsibilities (including EPA's 404(b)(1) Guidelines) to provide a single document that streamlines and enables informed decision-making by the USACE, including but not limited to, adoption of the EIS, issuance of necessary RODs, Section 404 permit decisions, and Section 408 permit decisions (as applicable) for alteration/modification of completed federal flood risk management facilities and any associated operation and maintenance, and real estate permissions or instruments (as applicable).

S.14.3 Surface Transportation Board

On completion of the environmental process and issuance of a ROD by the FRA, STB will issue a final decision on whether to approve the proposed project (the final decision also serves as the STB's ROD under NEPA). In making its final decision, the STB will consider the transportation merits, environmental record, and recommendations from the STB's Office of Environmental Analysis on the preferred alternative and mitigation measures. No project-related construction may begin until the STB's final decision has been issued and has become effective.

S.14.4 California High-Speed Rail Authority Decision-Making

After completion of the environmental process, the Authority will consider whether to certify the Final EIR/EIS for compliance with CEQA. Once the Authority certifies the Final EIR/EIS, it can

approve the project and make related CEQA decisions (findings, mitigation plan, and potential statement of overriding considerations). The required CEQA findings prepared for each significant effect will be one of the following:

- Changes or alternatives have been required or incorporated into the project that avoid or substantially lessen the significant environmental effect as identified in the Final EIR.
- Changes or alternatives are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency.
- Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or HST alternatives identified in the Final EIR.

If the Authority proceeds with approval of the project, the Authority would file a Notice of Determination (NOD) that describes the project and whether the project will have a significant effect on the environment. If the Authority approves a project that will result in the occurrence of significant effects identified in the Final EIR but not avoided or substantially lessened, CEQA requires the preparation of a Statement of Overriding Considerations which provides specific reasons to support the project, including economic, legal, social, technological, or other benefits of the proposed project that outweigh unavoidable adverse environmental effects. If such a statement is prepared, the Authority's NOD will reference the statement.

For purposes of this Fresno to Bakersfield Section EIR/EIS, project approval would include selection of a north/south alignment alternative and selection of station locations. The Authority anticipates identifying a preferred HMF facility site from among the HMF alternative sites examined in this document. The Authority is also considering HMF facility alternative sites as part of the Merced to Fresno Section EIR/EIS. A final decision on the HMF facility location is anticipated to occur at a date later than the decisions on the north/south alignments and stations, and based on the Authority's consideration of the preferred HMF alternative sites from both the Fresno to Bakersfield and Merced to Fresno sections.

S.14.5 Project Implementation

After the issuance of the FRA's ROD and the Authority's NOD, the Authority could complete final design, obtain construction permits, and acquire property before construction.

This page intentionally left blank



CALIFORNIA
High-Speed Rail Authority



U.S. Department
of Transportation
Federal Railroad
Administration

Table S-2

Comparison of Impacts of HST Alignment Alternatives Page 1A

Impact	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Project Costs																																				
Project costs (not including HMF) by alternative Base Year FY 2010 Dollars (millions)																																				
Transportation and Traffic																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for transportation and traffic.																																				
Project Impacts																																				
TR #12: Total number of permanent road closures.	46	47	47	46	46	52	52	45	51	46	61	44	52	47	47	62	62	45	45	53	53	62	62	45	45	53	53	60	60	68	68	60	68	46		
Air Quality and Global Climate Change																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for air quality and global climate change.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for air quality and global climate change.																																				
Noise and Vibration																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for noise and vibration.																																				
Project Impacts																																				
N&V #3: Number of severe operational noise impacts to sensitive receivers.	4,412	4,471	4,533	4,526	4,502	4,233	4,209	4,447	4,154	4,402	3,177	4,731	3,423	4,461	4,523	3,236	3,298	4,790	4,852	3,482	3,544	3,226	3,288	4,780	4,842	3,472	3,534	3,555	3,617	2,247	2,309	3,545	3,607	2,237	2,299	4,516
N&V #6: Potential impact from increased traffic noise	Yes	No	Yes	Yes	Yes	Yes	Yes	No																												
Electromagnetic Fields and Electromagnetic Interference																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for electromagnetic field and electromagnetic interference.																																				
Project Impacts																																				
EMF/EMI #5: Impacts to sensitive medical devices or imaging equipment.	No	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No																					
Public Utilities and Energy																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for public utilities and energy.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for public utilities and energy.																																				

Table S-2

Comparison of Impacts of HST Alignment Alternatives Page 1B

Impact	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Project Costs																																				
Project costs (not including HMF) by alternative Base Year FY 2010 Dollars (millions)																																				
7,743 7,429 7,524 7,882 7,977 7,884 7,979 7,303 7,398 7,844 7,939 7,846 7,941 7,625 7,720 7,627 7,722 7,499 7,594 7,501 7,596 7,250 7,345 7,031 7,126 7,484 7,579 7,486 7,581 6,905 7,000 7,446 7,541 7,448 7,543 7,227																																				
Transportation and Traffic																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for transportation and traffic.																																				
Project Impacts																																				
TR #12: Total number of permanent road closures.	46	61	61	44	44	52	52	61	61	44	44	52	52	59	59	67	67	59	59	67	67	52	67	67	50	50	58	58	67	67	50	50	58	58	65	
Air Quality and Global Climate Change																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for air quality and global climate change.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for air quality and global climate change.																																				
Noise and Vibration																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for noise and vibration.																																				
Project Impacts																																				
N&V #3: Number of severe operational noise impacts to sensitive receivers.	4,492	3,291	3,267	4,845	4,821	3,537	3,513	3,281	3,257	4,835	4,811	3,527	3,503	3,610	3,586	2,302	2,278	3,600	3,576	2,292	2,268	4,223	4,199	2,998	2,974	4,552	4,528	3,244	3,220	2,988	2,964	4,542	4,518	3,234	3,210	3,317
N&V #6: Potential impact from increased traffic noise	No																																			
Electromagnetic Fields and Electromagnetic Interference																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for electromagnetic field and electromagnetic interference.																																				
Project Impacts																																				
EMF/EMI #5: Impacts to sensitive medical devices or imaging equipment.	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	Yes																						
Public Utilities and Energy																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for public utilities and energy.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for public utilities and energy.																																				

Table S-2

Comparison of Impacts of HST Alignment Alternatives Page 1C

Impact	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108
Project Costs																																				
Project costs (not including HMF) by alternative Base Year FY 2010 Dollars (millions)																																				
	7,322	7,229	7,324	7,101	7,196	7,103	7,198	7,865	7,646	8,099	8,101	7,520	8,061	8,063	7,842	7,844	7,716	7,718	7,467	6,248	7,701	7,703	7,122	7,663	7,665	7,444	7,446	7,318	7,320	7,363	7,904	7,906	7,559	7,561	7,685	7,687
Transportation and Traffic																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for transportation and traffic.																																				
Project Impacts																																				
TR #12: Total number of permanent road closures.	65	73	73	65	65	73	73	45	60	43	51	60	43	51	58	66	58	66	51	66	49	57	66	49	57	64	72	64	72	61	44	52	59	67	59	67
Air Quality and Global Climate Change																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for air quality and global climate change.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for air quality and global climate change.																																				
Noise and Vibration																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for noise and vibration.																																				
Project Impacts																																				
N&V #3: Number of severe operational noise impacts to sensitive receivers.	3,293	2,009	1,985	3,307	3,283	1,999	1,975	4,437	3,212	4,766	3,458	3,202	4,756	3,448	3,531	2,223	3,521	2,213	4,144	2,919	4,473	3,165	2,909	4,463	3,155	3,238	1,930	3,228	1,920	3,167	4,721	3,413	3,486	2,178	3,496	2,188
N&V #6: Potential impact from increased traffic noise	No	Yes	Yes	Yes	Yes	Yes	Yes																													
Electromagnetic Fields and Electromagnetic Interference																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for electromagnetic field and electromagnetic interference.																																				
Project Impacts																																				
EMF/EMI #5: Impacts to sensitive medical devices or imaging equipment.	Yes	No	No	Yes	No	No	Yes	Yes	No	Yes																										
Public Utilities and Energy																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for public utilities and energy.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for public utilities and energy.																																				

Table S-2

Comparison of Impacts of HST Alignment Alternatives Page 2A

Impact	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36																																	
	Biological Resources and Wetlands																																																																				
Construction Impacts																																																																					
Special-Status Plants																																																																					
BIO #1: Number of acres temporarily impacted that has potential to support special-status plant species.	241	253	248	266	244	274	251	239	246	302	256	235	238	313	309	267	262	246	241	249	244	328	323	307	302	310	305	260	256	263	259	321	316	324	319	327																																	
Special-Status Wildlife Species																																																																					
BIO #2: Number of acres temporarily impacted that has potential to support special-status wildlife species.*Acres represent habitat of Townsend's big-eared bat, which encompasses all species' habitats.	2,214	1,775	1,769	1,796	1,871	1,783	1,858	2,228	2,215	2,214	1,958	2,215	2,238	1,775	1,770	1,519	1,513	1,776	1,771	1,799	1,793	1,519	1,514	1,777	1,771	1,799	1,793	1,520	1,515	1,543	1,537	1,521	1,515	1,543	1,537	1,796																																	
Habitats of Concern																																																																					
Special-Status Plant Communities																																																																					
BIO #3: Number of acres temporarily disturbed that supports special-status plant communities and riparian areas.	243	254	249	275	252	268	245	247	240	303	257	235	238	315	310	268	264	246	242	249	245	329	324	307	303	310	306	261	256	264	259	322	317	325	320	336																																	
Jurisdictional Waters																																																																					
BIO #3: Number of acres directly and indirectly impacted that contain jurisdictional waters.	31	29	30	32	46	32	46	31	31	28	30	31	30	25	26	27	29	28	29	28	29	23	25	24	25	24	25	26	28	26	28	22	24	22	24	29																																	

Table S-2

Comparison of Impacts of HST Alignment Alternatives Page 2B

Impact	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Biological Resources and Wetlands																																				
Construction Impacts																																				
Special-Status Plants																																				
BIO #1: Number of acres temporarily impacted that has potential to support special-status plant species.																																				
	304	281	258	260	237	263	240	341	319	320	298	323	301	274	251	277	255	335	312	338	315	334	312	288	265	267	244	270	247	349	326	328	305	331	308	281
Special-Status Wildlife Species																																				
BIO #2: Number of acres temporarily impacted that has potential to support special-status wildlife species.*Acres represent habitat of Townsend's big-eared bat, which encompasses all species' habitats.																																				
	1,871	1,540	1,615	1,797	1,872	1,819	1,895	1,540	1,615	1,797	1,873	1,820	1,895	1,541	1,616	1,563	1,639	1,541	1,617	1,564	1,639	1,783	1,858	1,527	1,602	1,784	1,859	1,806	1,882	1,527	1,602	1,784	1,860	1,807	1,882	1,528
Habitats of Concern																																				
Special-Status Plant Communities																																				
BIO #3: Number of acres temporarily disturbed that supports special-status plant communities and riparian areas.																																				
	313	289	267	267	245	270	248	350	327	328	305	331	308	282	259	285	262	342	320	345	323	328	306	282	259	260	238	263	241	343	320	321	298	324	301	274
Jurisdictional Waters																																				
BIO #4: Number of acres directly and indirectly temporarily impacted that contain jurisdictional waters.																																				
	42	31	45	32	45	32	45	27	41	28	41	28	41	30	44	30	44	26	40	26	40	28	42	31	44	31	45	31	45	27	40	27	41	27	41	30

Table S-2

Comparison of Impacts of HST Alignment Alternatives Page 2C

Impact	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108
Biological Resources and Wetlands																																				
Construction Impacts																																				
Special-Status Plants																																				
BIO #1: Number of acres temporarily impacted that has potential to support special-status plant species.	259	284	262	342	319	345	322	300	253	232	235	314	293	296	247	250	307	310	307	261	240	243	321	300	303	254	257	314	317	316	295	298	310	313	249	252
Special-Status Wildlife Species																																				
BIO #2: Number of acres temporarily impacted that has potential to support special-status wildlife species.*Acres represent habitat of Townsend's big-eared bat, which encompasses all species' habitats.	1,603	1,550	1,626	1,528	1,604	1,551	1,626	2,229	1,972	2,230	2,252	1,973	2,230	2,252	1,974	1,996	1,974	1,996	2,216	1,959	2,217	2,239	1,960	2,217	2,239	1,961	1,983	1,961	1,983	1,958	2,216	2,238	1,960	1,982	1,959	1,982
Habitats of Concern																																				
Special-Status Plant Communities																																				
BIO #3: Number of acres temporarily disturbed that supports special-status plant communities and riparian areas.	252	277	255	335	313	338	316	308	262	240	243	322	301	304	254	257	315	318	301	255	233	236	315	293	296	247	250	308	311	318	296	299	310	313	249	252
Jurisdictional Waters																																				
BIO #3: Number of acres directly and indirectly impacted that contain jurisdictional waters.	43	30	43	26	40	26	39	28	30	31	30	26	27	27	29	29	25	25	27	30	30	30	26	26	29	29	25	25	26	27	25	25	29	29		

Table S-2

Comparison of Impacts of HST Alignment Alternatives Page 3A

Impact	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Conservation Areas																																				
BIO #3: Number of acres temporarily impacted that are located in USFWS recovery plans.	628	628	628	627	627	638	638	627	638	764	615	630	652	764	764	615	615	630	630	652	652	750	750	765	765	787	787	616	616	638	638	752	752	774	774	762
BIO #3: Number of acres that would disturb portions of the Allensworth Ecological Reserve.	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0		
Protected Trees																																				
BIO #3: Number of acres disturbed that support protected trees.	117	127	126	121	120	119	118	111	109	115	117	116	120	125	124	127	126	126	125	130	129	125	124	124	123	128	127	126	125	130	129	124	123	128	127	119
Project Impacts																																				
Special-Status Plant Species																																				
BIO #5: Number of acres impacted that has potential to support special-status plant species.	402	403	411	503	536	490	523	490	477	356	412	414	411	357	365	413	421	415	423	412	420	367	375	369	377	366	374	425	433	422	430	379	387	376	384	457
Special-Status Wildlife Species																																				
BIO #6: Number of acres impacted that has potential to support special-status wildlife species.*Acres represent habitat of Townsend's big-eared bat, which encompasses all species' habitats.	4,747	4,474	4,557	4,475	4,606	4,504	4,635	4,748	4,777	4,666	4,493	4,719	4,700	4,394	4,476	4,220	4,303	4,446	4,529	4,427	4,510	4,139	4,222	4,365	4,448	4,347	4,429	4,192	4,275	4,173	4,256	4,111	4,194	4,092	4,175	4,394

Table S-2

Comparison of Impacts of HST Alignment Alternatives Page 3B

Impact	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Conservation Areas																																				
BIO #3: Number of acres temporarily impacted that are located in USFWS recovery plans.	762	613	613	628	628	650	650	748	748	763	763	786	786	614	614	637	637	750	750	772	772	774	774	625	625	640	640	662	662	760	760	775	775	797	797	626
BIO #3: Number of acres that would disturb portions of the Allensworth Ecological Reserve.	0	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	1		
Protected Trees																																				
BIO #3: Number of acres disturbed that support protected trees.	118	121	120	120	119	124	123	119	118	118	117	122	121	120	119	124	123	118	117	122	121	117	116	119	118	118	117	122	121	117	116	116	115	120	119	118
Project Impacts																																				
Special-Status Plant Species																																				
BIO #5: Number of acres impacted that has potential to support special-status plant species.	490	513	546	515	548	512	545	467	500	469	502	466	499	525	558	522	555	479	512	476	509	444	477	500	533	501	534	498	531	454	487	455	488	452	485	511
Special-Status Wildlife Species																																				
BIO #6: Number of acres impacted that has potential to support special-status wildlife species.*Acres represent habitat of Townsend's big-eared bat, which encompasses all species' habitats.	4,525	4,221	4,352	4,447	4,578	4,428	4,559	4,140	4,271	4,366	4,497	4,347	4,478	4,193	4,324	4,174	4,305	4,112	4,243	4,093	4,224	4,424	4,555	4,250	4,381	4,476	4,607	4,457	4,588	4,170	4,301	4,395	4,526	4,377	4,508	4,222

Table S-2

Comparison of Impacts of HST Alignment Alternatives Page 3C

Impact	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108
Conservation Areas																																				
BIO #3: Number of acres temporarily impacted that are located in USFWS recovery plans.	626	648	648	761	761	784	784	762	613	628	650	748	763	786	614	637	750	772	774	625	640	662	760	775	797	626	648	761	784	750	765	787	752	774	616	638
BIO #3: Number of acres that would disturb portions of the Allensworth Ecological Reserve.	1	1	1	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0	1	1			
Protected Trees																																				
BIO #3: Number of acres disturbed that support protected trees.	117	122	121	116	115	120	119	109	111	110	114	109	108	112	110	114	108	112	107	109	108	112	107	106	110	108	112	106	110	115	114	118	114	118	116	120
Project Impacts																																				
Special-Status Plant Species																																				
BIO #5: Number of acres impacted that has potential to support special-status plant species.	544	508	541	465	498	462	495	444	500	502	499	454	456	453	512	509	466	463	431	487	488	485	441	442	439	498	495	452	449	366	368	365	378	375	424	421
Special-Status Wildlife Species																																				
BIO #6: Number of acres impacted that has potential to support special-status wildlife species.*Acres represent habitat of Townsend's big-eared bat, which encompasses all species' habitats.	4,353	4,203	4,334	4,141	4,272	4,123	4,254	4,667	4,494	4,719	4,701	4,413	4,639	4,620	4,465	4,447	4,384	4,366	4,696	4,523	4,749	4,730	4,442	4,668	4,649	4,495	4,476	4,414	4,395	4,412	4,638	4,619	4,384	4,365	4,465	4,446

Table S-2

Comparison of Impacts of HST Alignment Alternatives Page 4A

Impact	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Habitats of Concern																																				
Special Status-Plant Communities																																				
BIO #7: Number of acres disturbed that supports special-status plant communities and riparian areas.																																				
411	411	419	498	531	511	544	485	498	366	421	419	416	366	374	421	429	419	427	416	424	376	384	375	383	372	380	429	437	426	434	385	393	382	390	453	
Jurisdictional Waters																																				
BIO #7: Number of acres directly and indirectly impacted that contain jurisdictional waters																																				
140	140	160	142	146	128	131	142	128	133	140	143	143	133	154	140	160	143	163	144	164	133	154	136	157	137	157	143	163	143	164	136	157	137	157	135	
Conservation Areas																																				
BIO #7: Number of acres that would disturb portions of recovery plans.																																				
1,152	1,152	1,152	1,054	1,054	1,048	1,048	1,054	1,048	1,150	1,169	1,123	1,104	1,150	1,150	1,169	1,169	1,123	1,123	1,104	1,104	1,167	1,167	1,121	1,121	1,102	1,102	1,140	1,140	1,121	1,121	1,138	1,138	1,120	1,120	1,052	
BIO #7: Number of acres that would disturb portions of the Allensworth Ecological Reserve.																																				
14	14	14	14	14	14	14	14	14	0	14	14	14	0	0	14	14	14	14	14	14	0	0	0	0	0	14	14	14	0	0	0	0	0			
Protected Trees																																				
BIO #7: Number of acres disturbed that support protected trees.																																				
194	239	248	237	246	237	246	192	192	190	227	230	197	235	244	272	281	275	284	242	251	268	277	271	280	238	247	308	317	275	284	304	313	271	280	233	
Hydrology and Water Resources																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for hydrology and water quality.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for hydrology and water quality.																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for geology and soils.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for geology and soils.																																				

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 4B

Impact	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	
Habitats of Concern																																					
Special Status-Plant Communities																																					
BIO #7: Number of acres disturbed that supports special-status plant communities and riparian areas.																																					
	486	508	541	506	539	503	536	463	496	461	494	458	491	516	549	513	546	471	504	468	501	467	500	521	554	520	553	517	550	476	510	475	508	472	505	530	
Jurisdictional Waters																																					
BIO #7: Number of acres directly and indirectly impacted that contain jurisdictional waters																																					
	139	142	146	145	149	146	149	135	139	138	142	139	143	145	149	146	149	138	142	139	143	121	125	128	131	131	134	131	135	121	125	124	128	125	128	131	
Conservation Areas																																					
BIO #7: Number of acres that would disturb portions of recovery plans.																																					
	1,052	1,072	1,072	1,025	1,025	1,007	1,007	1,070	1,070	1,023	1,023	1,005	1,005	1,043	1,043	1,024	1,024	1,041	1,041	1,022	1,022	1,046	1,046	1,065	1,065	1,019	1,019	1,000	1,000	1,063	1,063	1,017	1,017	998	998	1,036	
BIO #7: Number of acres that would disturb portions of the Allensworth Ecological Reserve.																																					
	0	14	14	14	14	14	14	14	0	0	0	0	0	0	14	14	14	14	0	0	0	0	14	14	14	14	14	14	0	0	0	0	14				
Protected Trees																																					
BIO #7: Number of acres disturbed that support protected trees.																																					
	242	270	279	273	282	240	249	266	275	269	278	236	245	306	315	273	282	302	311	269	278	233	242	270	279	273	282	240	249	266	275	269	278	236	245	306	
Hydrology and Water Resources																																					
Construction Impacts - There are no significant differentiating construction impacts between alternatives for hydrology and water quality.																																					
Project Impacts - There are no significant differentiating project impacts between alternatives for hydrology and water quality.																																					
Construction Impacts - There are no significant differentiating construction impacts between alternatives for geology and soils.																																					
Project Impacts - There are no significant differentiating project impacts between alternatives for geology and soils.																																					

Table S-2

Comparison of Impacts of HST Alignment Alternatives Page 4C

Impact	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	
Habitats of Concern																																					
Special Status-Plant Communities																																					
BIO #7: Number of acres disturbed that supports special-status plant communities and riparian areas.																																					
	563	527	560	485	518	482	515	440	495	493	490	450	448	445	503	500	458	455	454	508	507	504	464	462	459	517	514	472	469	376	374	371	384	381	429	426	
Jurisdictional Waters																																					
BIO #19: Number of acres directly and indirectly impacted that contain jurisdictional waters																																					
	134	131	135	124	128	125	128	135	142	145	146	135	138	139	145	146	138	139	121	128	131	132	121	124	125	131	132	124	125	133	136	137	136	137	143	143	
Conservation Areas																																					
BIO #7: Number of acres that would disturb portions of recovery plans.																																					
	1,036	1,018	1,018	1,034	1,034	1,016	1,016	1,016	1,052	1,072	1,025	1,007	1,070	1,023	1,005	1,043	1,024	1,041	1,022	1,046	1,065	1,019	1,000	1,063	1,017	998	1,036	1,018	1,034	1,016	1,167	1,121	1,102	1,138	1,120	1,140	1,121
BIO #7: Number of acres that would disturb portions of the Allensworth Ecological Reserve.																																					
	14	14	14	0	0	0	0	0	14	14	0	0	0	14	14	0	0	0	14	14	0	0	0	0	0	0	0	0	0	0	0	0	14	14			
Protected Trees																																					
BIO #7: Number of acres disturbed that support protected trees.																																					
	315	273	282	302	311	269	278	188	225	228	195	221	224	191	261	228	257	224	188	225	228	195	221	224	191	261	228	257	224	223	226	193	259	226	263	230	
Hydrology and Water Resources																																					
Construction Impacts - There are no significant differentiating construction impacts between alternatives for hydrology and water quality.																																					
Project Impacts - There are no significant differentiating project impacts between alternatives for hydrology and water quality.																																					
Construction Impacts - There are no significant differentiating construction impacts between alternatives for geology and soils.																																					
Project Impacts - There are no significant differentiating project impacts between alternatives for geology and soils.																																					

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 5A

Impact	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Hazardous Materials and Wastes																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for Hazardous Materials and Wastes.																																				
Project Impacts																																				
HMW #4: Temporary Hazardous Material and Waste Activities in the Proximity of Schools.	22	26	24	25	23	24	22	21	20	22	18	24	23	26	24	22	20	28	26	27	25	22	20	28	26	27	25	24	22	23	21	24	22	23	21	25
Safety and Security																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for safety and security.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for safety and security.																																				
Socioeconomics, Communities, and Environmental Justice																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for socioeconomics, communities, and environmental justice.																																				
Project Impacts																																				
SO #6: Division of existing communities of Ponderosa Road/Edna Way, Newark Avenue, and Crome.	2	1	1	1	1	2	2	2	3	2	1	2	2	1	1	0	0	1	1	1	1	0	0	1	1	1	0	0	0	0	0	0	1			
SO #6: Displacement of Bakersfield High School's Industrial Arts building.	Yes	No	No	Yes	Yes	Yes	No	No	No	No	Yes	Yes	No	Yes																						
SO #6: Displacement of the Mercado Latino Tianguis.	Yes	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	Yes															
SO #6: Displacement of the Bakersfield Homeless Shelter.	No	No	Yes	No	No	No	No	No	No	Yes	Yes	No	No	Yes	Yes	No	Yes	No	No	Yes	Yes	No														
SO #6: Displacement of Mercy Hospital medical complex facilities.	No	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No																					
SO #6: Displacement of religious facilities.	4	4	4	4	4	4	4	4	4	4	3	5	2	4	4	3	3	5	5	2	2	3	3	5	5	2	2	4	4	1	1	4	1	4		
SO #6: Displacement of Government Facilities in Bakersfield	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1				

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 5B

Impact	Comparison of Impacts of HS2 Alignment Alternatives - Page 30																																			
	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Hazardous Materials and Wastes																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for Hazardous Materials and Wastes.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for Hazardous Materials and Wastes.																																				
HMW #4: Temporary Hazardous Material and Waste Activities in the Proximity of Schools.	23	21	19	27	25	26	24	21	19	27	25	26	24	23	21	22	20	23	21	22	20	24	22	20	18	26	24	25	23	20	18	26	24	25	23	22
Safety and Security																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for safety and security.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for safety and security.																																				
Socioeconomics, Communities, and Environmental Justice																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for socioeconomics, communities, and environmental justice.																																				
Project Impacts																																				
SO #6: Division of existing communities of Ponderosa Road/Edna Way, Newark Avenue, and Crome.	1	0	0	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	1	1	2	2	2	1			
SO #6: Displacement of Bakersfield High School's Industrial Arts building.	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	No	No	No	No	No												
SO #6: Displacement of the Mercado Latino Tianguis.	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No			
SO #6: Displacement of the Bakersfield Homeless Shelter.	No	No	No	No	No	Yes	Yes	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	
SO #6: Displacement of Mercy Hospital medical complex facilities.	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes											
SO #6: Displacement of religious facilities.	4	3	3	5	5	2	2	3	3	5	5	2	2	4	4	1	1	4	4	1	1	4	4	3	3	5	5	2	2	3	3	5	5	2	2	4
SO #6: Displacement of Government Facilities in Bakersfield	1	1	1	3	3	2	2	1	1	3	3	2	2	3	3	2	2	3	3	2	2	1	1	1	3	3	2	2	1	1	3	3	2	2	3	

Table S-2

Comparison of Impacts of HST Alignment Alternatives Page 6A

Impact	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	460	449	448	446	448	419	421	461	434	453	447	466	382	442	441	436	435	455	454	371	370	429	428	448	447	364	363	442	441	358	357	435	434	351	350	439
SO #9: Estimated number of housing units displaced																																				
SO #10: Estimated number of businesses displaced	417	419	419	405	405	406	406	402	403	417	385	264	409	419	419	387	387	266	266	411	411	387	387	266	266	411	411	234	234	379	379	234	234	379	379	405
Station Planning, Land Use, and Development																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for station planning, land use, and development.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for station planning, land use, and development.																																				
Agricultural Lands																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for agricultural lands.																																				
Project Impacts																																				
AG #4: Number of acres of agricultural land converted to nonagricultural use.	3,541	3,171	3,298	3,056	3,235	3,149	3,328	3,413	3,506	3,509	3,436	3,541	3,541	3,139	3,266	3,066	3,193	3,171	3,298	3,171	3,298	3,034	3,161	3,139	3,266	3,139	3,266	3,066	3,193	3,066	3,193	3,034	3,161	3,034	3,161	3,024
AG #6: Number of acres of Williamson Act or FSZ contract land converted to nonagricultural use.	2,105	1,909	1,986	1,718	1,824	1,738	1,844	1,971	1,991	2,095	2,092	2,105	2,105	1,899	1,976	1,896	1,973	1,909	1,986	1,909	1,986	1,886	1,963	1,899	1,976	1,899	1,976	1,896	1,973	1,896	1,973	1,886	1,963	1,886	1,963	1,708
Parks, Recreation, and Open Space																																				
Construction Impacts																																				
PK #1: Activities would increase noise for Father Wyatt Park.	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes																										
PK #1: Activities would increase noise for McMurtrey Aquatic Center.	No	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	No	No	Yes	No																						
PK #1: Activities would close portions of and increase noise for the Amtrak Station Playground.	Yes	No	No	Yes	Yes	No	No	No	No	Yes	Yes	No	Yes																							

Table S-2

Comparison of Impacts of HST Alignment Alternatives Page 6B

Impact	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
	441	433	435	452	454	368	370	426	428	445	447	361	363	439	441	355	357	432	434	348	350	412	414	406	408	425	427	341	343	399	401	418	420	334	336	412
SO #9: Estimated number of housing units displaced																																				
SO #10: Estimated number of businesses displaced	405	373	373	252	252	397	397	373	373	252	252	397	397	220	220	365	365	220	220	365	365	406	406	374	374	253	253	398	374	374	253	253	398	398	221	
Station Planning, Land Use, and Development																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for station planning, land use, and development.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for station planning, land use, and development.																																				
Agricultural Lands																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for agricultural lands.																																				
Project Impacts																																				
AG #4: Number of acres of agricultural land converted to nonagricultural use.	3,203	2,951	3,130	3,056	3,235	3,056	3,235	2,919	3,098	3,024	3,203	3,024	3,203	2,951	3,130	2,951	3,130	2,919	3,098	2,919	3,098	3,117	3,296	3,044	3,223	3,149	3,328	3,149	3,328	3,012	3,191	3,117	3,296	3,117	3,296	3,044
AG #6: Number of acres of Williamson Act or FSZ contract land converted to nonagricultural use.	1,814	1,705	1,811	1,718	1,824	1,718	1,824	1,695	1,801	1,708	1,814	1,708	1,814	1,705	1,811	1,705	1,811	1,695	1,801	1,695	1,801	1,728	1,834	1,725	1,831	1,738	1,844	1,738	1,844	1,715	1,821	1,728	1,834	1,728	1,834	1,725
Parks, Recreation, and Open Space																																				
Construction Impacts																																				
PK #1: Activities would increase noise for Father Wyatt Park.	Yes	No																																		
PK #1: Activities would increase noise for McMurtrey Aquatic Center.	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes													
PK #1: Activities would close portions of and increase noise for the Amtrak Station Playground.	Yes	Yes	Yes	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No																	

Table S-2

Comparison of Impacts of HST Alignment Alternatives Page 6C

Impact	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108
SO #9: Estimated number of housing units Displaced	414	328	330	405	407	321	323	454	448	467	383	441	460	376	454	370	447	363	427	421	440	356	414	433	349	427	343	420	336	440	459	375	446	362	453	369
SO #10: Estimated number of Businesses Displaced	221	366	366	221	221	366	366	402	370	249	394	370	249	394	217	362	217	362	403	371	250	395	371	250	395	218	363	218	363	385	264	409	232	377	232	377
Station Planning, Land Use, and Development																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for station planning, land use, and development.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for station planning, land use, and development.																																				
Agricultural Lands																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for agricultural lands.																																				
Project Impacts																																				
AG #4: Number of acres of agricultural land converted to nonagricultural use.	3,223	3,044	3,223	3,012	3,191	3,012	3,191	3,381	3,308	3,413	3,413	3,276	3,381	3,381	3,308	3,276	3,276	3,474	3,401	3,506	3,506	3,369	3,474	3,474	3,401	3,401	3,369	3,369	3,404	3,509	3,509	3,404	3,436	3,436		
AG #6: Number of acres of Williamson Act or FSZ contract land converted to nonagricultural use.	1,831	1,725	1,831	1,715	1,821	1,715	1,821	1,961	1,958	1,971	1,971	1,948	1,961	1,961	1,958	1,958	1,948	1,948	1,981	1,978	1,991	1,991	1,968	1,981	1,981	1,978	1,978	1,968	2,082	2,095	2,095	2,082	2,082	2,092	2,092	
Parks, Recreation, and Open Space																																				
Construction Impacts																																				
PK #1: Activities would increase noise for Father Wyatt Park.	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes																											
PK #1: Activities would increase noise for McMurtrey Aquatic Center.	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes																						
PK #1: Activities would close portions of and increase noise for the Amtrak Station Playground.	No	Yes	Yes	No	No	Yes	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	Yes	No	No	No	No	No	No										

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 7A

Impact	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
PK #1: Activities would increase noise for Bakersfield High School.	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	No	No	Yes	Yes	Yes													
Project Impacts																																					
PK#2: Acquisition of a portion both of the Allensworth State Historic Park and Ecological Reserve.	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	No	No	No	No														
PK#4: HST would degrade existing visual character and increase noise for Father Wyatt Park.	No	No	No	Yes	Yes	No	No	Yes	No	Yes																											
PK#4: Addition of a modern feature not consistent with historic atmosphere of Allensworth State Historic Park.	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	No	No	No	No														
PK #4: Activities would increase noise for McMurtry Aquatic Center.	No	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	No																						
PK#4: HST would degrade existing visual character for Bakersfield High School.	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes																					
Aesthetics and Visual Resources																																					
Construction Impacts - There are no significant differentiating construction impacts between alternatives for aesthetics and visual resources.																																					
Project Impacts - There are no significant differentiating project impacts between alternatives for aesthetics and visual resources.																																					
Cultural and Paleontological Resources																																					
Construction Impacts																																					
Impact CUL #1: Effect on significant prehistoric and historic-era archaeological resources.	2	4	4	4	4	4	4	4	2	2	4	2	3	2	6	6	4	4	5	5	4	4	6	6	7	7	6	6	5	5	4	4	7	7	6	6	6

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 7B

Impact	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
PK #1: Activities would increase noise for Bakersfield High School.	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	No	No	No			
Project Impacts																																				
PK#2: Acquisition of a portion both of the Allensworth State Historic Park and Ecological Reserve.																																				
PK#4: HST would degrade existing visual character and increase noise for Father Wyatt Park.	Yes	No	No	No	No	No																														
PK#4: Addition of a modern feature not consistent with historic atmosphere of Allensworth State Historic Park.	No	Yes	No	No	No	No	Yes																													
PK #4: Activities would increase noise for McMurtrey Aquatic Center.	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes																				
PK#4: HST would degrade existing visual character for Bakersfield High School.	Yes	Yes	Yes	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No																
Aesthetics and Visual Resources																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for aesthetics and visual resources.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for aesthetics and visual resources.																																				
Cultural and Paleontological Resources																																				
Construction Impacts																																				
Impact CUL #1: Effect on significant prehistoric and historic-era archaeological resources.	6	4	4	5	5	4	4	6	6	7	7	6	6	5	5	4	4	7	7	6	6	6	4	4	5	5	4	4	6	7	6	5				

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 7C

Impact	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	104	105	106	107	108
PK #1: Activities would increase noise for Bakersfield High School.	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	No	Yes	Yes	No	Yes															
Project Impacts																																			
PK#2: Acquisition of a portion both of the Allensworth State Historic Park and Ecological Reserve.	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	Yes	No	Yes	No	No	No	No	No	No	Yes	Yes				
PK#4: HST would degrade existing visual character and increase noise for Father Wyatt Park.	No	Yes	No																																
PK#4: Addition of a modern feature not consistent with historic atmosphere of Allensworth State Historic Park.	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No	No	Yes	Yes				
PK #4: Activities would increase noise for McMurtrey Aquatic Center.	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes																					
PK#4: HST would degrade existing visual character for Bakersfield High School.	No	Yes	Yes	No	Yes	No	No	No	No	No	No	Yes	Yes	No																					
Aesthetics and Visual Resources																																			
Construction Impacts - There are no significant differentiating construction impacts between alternatives for aesthetics and visual resources.																																			
Project Impacts - There are no significant differentiating project impacts between alternatives for aesthetics and visual resources.																																			
Cultural and Paleontological Resources																																			
Construction Impacts																																			
Impact CUL #1: Effect on significant prehistoric and historic-era archaeological resources.	5	4	4	7	7	6	6	4	2	3	2	4	5	4	3	2	5	4	4	2	3	2	4	5	4	3	2	5	4	4	5	4	3	2	

Table S-2

Impact	Comparison of Impacts of All Alternatives																																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		
CUL #2: Effect on historically significant built-environment resources.	19	20	20	20	20	20	20	19	19	18	19	18	22	19	19	20	20	19	19	23	23	19	19	18	18	22	22	19	19	23	23	18	18	22	22	19		
Project Impacts - There are no significant differentiating project impacts between alternatives for cultural and paleontological resources.																																						
Regional Growth																																						
Construction Impacts - There are no significant differentiating construction impacts between alternatives for regional growth.																																						
Project Impacts - There are no significant differentiating project impacts between alternatives for regional growth.																																						
Construction Impacts - There are no significant differentiating construction impacts between alternatives for cumulative impacts.																																						
Project Impacts - There are no significant differentiating project impacts between alternatives for cumulative impacts.																																						
Alternative Names – 108 Total Options																																						
1. BNSF	39. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Wasco Shafter Bypass	74. BNSF – HW Bypass 2 – Corcoran Bypass – Wasco Shafter Bypass –Bakersfield Hybrid																																				
2. BNSF – HW Bypass 1	40. BNSF – HW Bypass 2 – Corcoran Elevated – Bakersfield South	75. BNSF – HW Bypass 2 Modified – Corcoran Bypass – Wasco Shafter Bypass –Bakersfield Hybrid																																				
3. BNSF – HW Bypass 1 Modified	41. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Bakersfield South	76. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield South																																				
4. BNSF – HW Bypass 2 – Corcoran Elevated	42. BNSF – HW Bypass 2 – Corcoran Elevated – Bakersfield Hybrid	77. BNSF – HW Bypass 2 Modified – Corcoran Bypass – Allensworth Bypass – Wasco Shafter Bypass –Bakersfield South																																				
5. BNSF – HW Bypass 2 Modified – Corcoran Elevated	43. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Bakersfield Hybrid	78. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield Hybrid																																				
6. BNSF – HW Bypass 2 – Corcoran Bypass	44. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass	79. BNSF – HW Bypass 2 Modified – Corcoran Bypass – Allensworth Bypass – Wasco Shafter Bypass –Bakersfield Hybrid																																				
7. BNSF – HW Bypass 2 Modified – Corcoran Bypass	45. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass	80. BNSF – Corcoran Elevated – Allensworth Bypass																																				
8. BNSF – Corcoran Elevated	46. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass – Bakersfield South	81. BNSF – Corcoran Elevated – Wasco Shafter Bypass																																				
9. BNSF – Corcoran Bypass	47. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Allensworth Bypass – Bakersfield South	82. BNSF – Corcoran Elevated – Bakersfield South																																				
10. BNSF – Allensworth Bypass	48. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass – Bakersfield Hybrid	83. BNSF – Corcoran Elevated – Bakersfield Hybrid																																				
11. BNSF – Wasco Shafter Bypass	49. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Allensworth Bypass – Bakersfield Hybrid	84. BNSF – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass																																				
12. BNSF – Bakersfield South	50. BNSF – HW Bypass 2 – Corcoran Elevated – Wasco Shafter Bypass –Bakersfield South	85. BNSF – Corcoran Elevated – Allensworth Bypass – Bakersfield South																																				
13. BNSF – Bakersfield Hybrid	51. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Wasco Shafter Bypass –Bakersfield South	86. BNSF – Corcoran Elevated – Allensworth Bypass – Bakersfield Hybrid																																				
14. BNSF – HW Bypass 1 – Allensworth Bypass	52. BNSF – HW Bypass 2 – Corcoran Elevated – Wasco Shafter Bypass –Bakersfield Hybrid	87. BNSF – Corcoran Elevated – Wasco Shafter Bypass – Bakersfield South																																				
15. BNSF – HW Bypass 1 Modified – Allensworth Bypass	53. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Wasco Shafter Bypass –Bakersfield Hybrid	88. BNSF – Corcoran Elevated – Wasco Shafter Bypass – Bakersfield Hybrid																																				
16. BNSF – HW Bypass 1 – Wasco Shafter Bypass	54. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield South	89. BNSF – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield South																																				
17. BNSF – HW Bypass 1 Modified – Wasco Shafter Bypass	55. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass –Bakersfield South	90. BNSF – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield Hybrid																																				
18. BNSF – HW Bypass 1 – Bakersfield South	56. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield Hybrid	91. BNSF – Corcoran Bypass – Allensworth Bypass																																				
19. BNSF – HW Bypass 1 Modified – Bakersfield South	57. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass –Bakersfield Hybrid	92. BNSF – Corcoran Bypass – Wasco Shafter Bypass																																				
20. BNSF – HW Bypass 1 – Bakersfield Hybrid	58. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass	93. BNSF – Corcoran Bypass – Bakersfield South																																				
21. BNSF – HW Bypass 1 Modified – Bakersfield Hybrid	59. BNSF – HW Bypass 2 Modified – Corcoran Bypass – Allensworth Bypass	94. BNSF – Corcoran Bypass – Bakersfield Hybrid																																				
22. BNSF – HW Bypass 1 – Allensworth Bypass –Wasco Shafter Bypass	60. BNSF – HW Bypass 2 – Corcoran Bypass – Wasco Shafter Bypass	95. BNSF – Corcoran Bypass – Allensworth Bypass – Wasco Shafter Bypass																																				
23. BNSF – HW Bypass 1 Modified – Allensworth Bypass –Wasco Shafter Bypass	61. BNSF – HW Bypass 2 Modified – Corcoran Bypass – Wasco Shafter Bypass	96. BNSF – Corcoran Bypass – Allensworth Bypass – Bakersfield South																																				
24. BNSF – HW Bypass 1 – Allensworth Bypass –Bakersfield South	62. BNSF – HW Bypass 2 – Corcoran Bypass – Bakersfield South	97. BNSF – Corcoran Bypass – Allensworth Bypass – Bakersfield Hybrid																																				
25. BNSF – HW Bypass 1 Modified – Allensworth Bypass –Bakersfield South	63. BNSF – HW Bypass 2 Modified – Corcoran Bypass – Bakersfield South	98. BNSF – Corcoran Bypass – Wasco Shafter Bypass – Bakersfield South																																				
26. BNSF – HW Bypass 1 – Allensworth Bypass –Bakersfield Hybrid	64. BNSF – HW Bypass 2 – Corcoran Bypass – Bakersfield Hybrid	99. BNSF – Corcoran Bypass – Wasco Shafter Bypass – Bakersfield Hybrid																																				
27. BNSF – HW Bypass 1 Modified – Allensworth Bypass –Bakersfield Hybrid	65. BNSF – HW Bypass 2 Modified – Corcoran Bypass – Bakersfield Hybrid	100. BNSF – Corcoran Bypass – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield South																																				
28. BNSF – HW Bypass 1 - Wasco Shafter Bypass –Bakersfield South	66. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass –Wasco Shafter Bypass	101. BNSF – Corcoran Bypass – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield Hybrid																																				
29. BNSF – HW Bypass 1 Modified - Wasco Shafter Bypass –Bakersfield South	67. BNSF – HW Bypass 2 Modified – Corcoran Bypass – Allensworth Bypass –Wasco Shafter Bypass	102. BNSF – Allensworth Bypass – Wasco Shafter Bypass																																				
30. BNSF – HW Bypass 1 - Wasco Shafter Bypass –Bakersfield Hybrid	68. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass –Bakersfield South	103. BNSF – Allensworth Bypass – Bakersfield South																																				
31. BNSF – HW Bypass 1 Modified - Wasco Shafter Bypass –Bakersfield Hybrid	69. BNSF – HW Bypass 2 Modified – Corcoran Bypass – Allensworth Bypass –Bakersfield South	104. BNSF – Allensworth Bypass – Bakersfield Hybrid																																				
32. BNSF – HW Bypass 1 - Allensworth Bypass –Wasco Shafter Bypass –Bakersfield South	70.																																					

Table S-2

Table S-2
Comparison of Impacts of HST Alignment Alternatives Page 8C

Impact	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	102	104	105	106	107	108
CUL #2: Effect on historically significant built-environment resources.	19	23	23	18	18	22	22	18	19	18	22	18	17	21	18	22	17	21	18	19	18	22	22	18	17	21	18	21	17	21	17	21	18	22		
Project Impacts - There are no significant differentiating project impacts between alternatives for cultural and paleontological resources.																																				
Regional Growth																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for regional growth.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for regional growth.																																				
Cumulative Impacts																																				
Construction Impacts - There are no significant differentiating construction impacts between alternatives for cumulative impacts.																																				
Project Impacts - There are no significant differentiating project impacts between alternatives for cumulative impacts.																																				
Alternative Names – 108 Total Options																																				
1. BNSF	39. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Wasco Shafter Bypass	74. BNSF – HW Bypass 2 – Corcoran Bypass – Wasco Shafter Bypass –Bakersfield Hybrid																																		
2. BNSF – HW Bypass 1	40. BNSF – HW Bypass 2 – Corcoran Elevated – Bakersfield South	75. BNSF – HW Bypass 2 Modified – Corcoran Bypass – Wasco Shafter Bypass –Bakersfield Hybrid																																		
3. BNSF – HW Bypass 1 Modified	41. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Bakersfield South	76. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass - Wasco Shafter Bypass – Bakersfield South																																		
4. BNSF – HW Bypass 2 – Corcoran Elevated	42. BNSF – HW Bypass 2 – Corcoran Elevated – Bakersfield Hybrid	77. BNSF – HW Bypass 2 Modified – Corcoran Bypass – Allensworth Bypass - Wasco Shafter Bypass – Bakersfield South																																		
5. BNSF – HW Bypass 2 Modified – Corcoran Elevated	43. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Bakersfield Hybrid	78. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass - Wasco Shafter Bypass – Bakersfield Hybrid																																		
6. BNSF – HW Bypass 2 – Corcoran Bypass	44. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass	79. BNSF – HW Bypass 2 Modified – Corcoran Bypass – Allensworth Bypass - Wasco Shafter Bypass – Bakersfield Hybrid																																		
7. BNSF – HW Bypass 2 Modified – Corcoran Bypass	45. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass	80. BNSF – Corcoran Elevated – Allensworth Bypass																																		
8. BNSF – Corcoran Elevated	46. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass – Bakersfield South	81. BNSF – Corcoran Elevated – Wasco Shafter Bypass																																		
9. BNSF – Corcoran Bypass	47. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Allensworth Bypass – Bakersfield South	82. BNSF – Corcoran Elevated – Bakersfield South																																		
10. BNSF – Allensworth Bypass	48. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass – Bakersfield Hybrid	83. BNSF – Corcoran Elevated – Bakersfield Hybrid																																		
11. BNSF – Wasco Shafter Bypass	49. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Allensworth Bypass – Bakersfield Hybrid	84. BNSF – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass																																		
12. BNSF – Bakersfield South	50. BNSF – HW Bypass 2 – Corcoran Elevated – Wasco Shafter Bypass –Bakersfield South	85. BNSF – Corcoran Elevated – Allensworth Bypass – Bakersfield South																																		
13. BNSF – Bakersfield Hybrid	51. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Wasco Shafter Bypass –Bakersfield South	86. BNSF – Corcoran Elevated – Allensworth Bypass – Bakersfield Hybrid																																		
14. BNSF – HW Bypass 1 – Allensworth Bypass	52. BNSF – HW Bypass 2 – Corcoran Elevated – Wasco Shafter Bypass –Bakersfield Hybrid	87. BNSF – Corcoran Elevated – Allensworth Bypass – Bakersfield South																																		
15. BNSF – HW Bypass 1 Modified – Allensworth Bypass	53. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Wasco Shafter Bypass –Bakersfield Hybrid	88. BNSF – Corcoran Elevated – Wasco Shafter Bypass – Bakersfield Hybrid																																		
16. BNSF – HW Bypass 1 – Wasco Shafter Bypass	54. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield South	89. BNSF – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield South																																		
17. BNSF – HW Bypass 1 Modified – Wasco Shafter Bypass	55. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield South	90. BNSF – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield Hybrid																																		
18. BNSF – HW Bypass 1 – Bakersfield South	56. BNSF – HW Bypass 2 – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield Hybrid	91. BNSF – Corcoran Bypass – Allensworth Bypass																																		
19. BNSF – HW Bypass 1 Modified – Bakersfield South	57. BNSF – HW Bypass 2 Modified – Corcoran Elevated – Allensworth Bypass – Wasco Shafter Bypass – Bakersfield Hybrid	92. BNSF – Corcoran Bypass – Allensworth Bypass																																		
20. BNSF – HW Bypass 1 – Bakersfield Hybrid	58. BNSF – HW Bypass 2 – Corcoran Bypass – Allensworth Bypass	93. BNSF – Corcoran Bypass – Bakersfield South																																		
21. BNSF – HW Bypass 1 Modified – Bakersfield Hybrid	59. BNSF – HW Bypass 2 Modified –																																			

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Transportation		
Construction Impacts		
There are no significant construction impacts for transportation and traffic.	No mitigation required	N/A
Project Impacts		
TR #12: Loss of Property Access as a Result of Road Closures.	TR MM#1: Access Maintenance for Property Owners.	Less than significant
TR #13: HST Station Area Existing Plus Project Roadway Impacts.	TR MM#8: Add New Lanes to Roadway.	Less than significant
TR #13: HST Station Area Future (2035) Plus Project Roadway Impacts.	TR MM#15: Add New Lanes to Roadway.	Less than significant
TR #13: HST Station Area Existing Plus Project Intersection Impacts.	TR MM#3: Add Signal to Intersection to Improve LOS/Operation.	Less than significant
TR #13: HST Station Area Future (2035) Plus Project Intersection Impacts.	TR MM#10: Add Signal to Intersection to Improve LOS/Operation. TR MM#11: Restripe Intersections. TR MM#12: Revise Signal Cycle Length. TR MM#13: Widen Approaches to Intersections. TR MM#14: Add Exclusive Turn Lanes to Intersections.	Less than significant
TR #14: HMF Site Future (2035) Plus Project Roadway Impacts.	TR MM#10: Add Signal to Intersection to Improve LOS/Operation.	Less than significant
TR #14: HMF Site Existing Plus Project Intersection Impacts.	TR MM#3: Add Signal to Intersection to Improve LOS/Operation.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
TR #14: HMF Site Future (2035) Plus Project Intersection Impacts.	TR MM#10: Add Signal to Intersection to Improve LOS/Operation. TR MM#12: Revise Signal Cycle Length.	Less than significant
TR #15: City of Corcoran Road Network Impacts.	TR MM#10: Add Signal to Intersection to Improve LOS/Operation.	Less than significant
Air Quality and Global Climate Change		
Construction Impacts		
AQ #1: Construction of the HST alternatives would exceed the CEQA emissions thresholds for VOCs, NO _x , PM ₁₀ , and PM _{2.5} . Therefore, it could potentially cause violations of NO ₂ , O ₃ , PM ₁₀ , and PM _{2.5} air quality standards or contribute substantially to NO ₂ , O ₃ , PM ₁₀ , and PM _{2.5} existing or projected air quality violations.	AQ-MM#1: Reduce Criteria Exhaust Emissions from Construction Equipment. AQ-MM#2: Reduce Criteria Exhaust Emissions from On-Road Construction Equipment. AQ-MM#4: Offset Emissions Through the VERA Program.	Less than significant
AQ #2: Construction of the HST alternatives would exceed the CEQA emissions thresholds for VOC, NO _x , PM ₁₀ , and PM _{2.5} . Therefore, it would conflict with the 1-hour Ozone Attainment Plan, the 8-hour Ozone Attainment Plan, and the PM ₁₀ and PM _{2.5} Attainment Plans.	AQ-MM#1: Reduce Criteria Exhaust Emissions from Construction Equipment. AQ-MM#2: Reduce Criteria Exhaust Emissions from On-Road Construction Equipment. AQ-MM#4: Offset Emissions Through the VERA Program.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
AQ #3: Material hauling outside the SJVAB would exceed CEQA emission thresholds for NO _x in the BAAQMD, Mojave Desert AQMD, Eastern Kern County APCD, and the South Coast AQMD, and would exceed the VOC threshold in South Coast AQMD for certain hauling scenarios. Therefore, it could potentially cause violations of NO ₂ , and O ₃ air quality standards or contribute substantially to NO ₂ and O ₃ existing or projected air quality violations in those air districts.	AQ-MM#2: Reduce Criteria Exhaust Emissions from On-Road Construction Equipment. AQ-MM#5: Purchase Offsets for Emissions Associated with Hauling Ballast Material in Certain Air Districts (i.e., Mojave Desert AQMD, BAAQMD, and the South Coast AQMD).	Less than significant
AQ # 8: Construction of the alignment may expose sensitive receptors to temporary substantial pollutant concentrations from concrete batch plants.	AQ-MM #3: Reduce the potential impact of concrete batch plants.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Project Impacts		
AQ #16: Operation of the HST station, HMF/MOWF may cause the total PM ₁₀ and PM _{2.5} ambient concentrations to exceed CAAQS due to the existing exceedances in the area.	AQ-MM #6: Reduce the potential impact of toxics. AQ-MM #7: Reduce the potential impact of stationary sources.	Less than significant
Noise and Vibration		
Construction Impacts		
N&V #1: Construction noise	N&V-MM#1: Construction noise mitigation measures.	Less than significant
N&V #2: Construction vibration	N&V-MM#2: Construction vibration mitigation measures.	Less than significant
Project Impacts		
N&V #3: Moderate and severe noise impacts from project operation to sensitive receptors.	N&V-MM #3: Implement Proposed California High-Speed Train Project Noise Mitigation Guidelines. N&V-MM #4: Vehicle noise specification. N&V-MM #5: Special trackwork at crossovers and turnouts. N&V-MM #6: Additional noise and vibration analysis following final design.	Significant in some locations; less than significant where fully mitigated
N&V #6: Impacts from Traffic Noise	N&V-MM #3: Implement Proposed California High-Speed Train Project Noise Mitigation Guidelines. N&V-MM #6: Additional noise and vibration analysis following final design.	Less than significant
Electromagnetic Fields and Electromagnetic Interference		
Construction Impacts		
There are no significant construction impacts for electromagnetic fields and electromagnetic interference.	No mitigation required	N/A
Project Impacts		
EMF/EMI #5: Impacts to sensitive equipment (medical devices or imaging equipment) from EMI.	EMF/EMI-MM #1: Protect sensitive equipment in accordance with the EMCPP.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Public Utilities and Energy		
Construction Impacts		
There are no significant construction impacts for public utilities and energy.	No mitigation required	N/A
Project Impacts		
PU&E#8: Potential Conflicts with Fixed Electrical Facilities	PU&E-MM#1: Reconfigure or relocate substations and/or ancillary components	Less than significant
Biological Resources and Wetlands		
Common Mitigation Measures		
<p>The following mitigation measures effectively mitigate impacts on multiple biological resources (e.g., special-status species and wildlife movement corridors). Common mitigation measures apply to many of the construction period and project impact categories listed below:</p>		
BIO-MM#1. Designate Project Biologist(s), and Project Biological Monitor(s).		
BIO-MM#2. Regulatory Agency Access.		
BIO-MM#3. Prepare and Implement a Worker Environmental Awareness Program (WEAP).		
BIO-MM#4. Prepare and Implement a Weed Control Plan and Annual Vegetation Control Plan.		
BIO-MM#5. Prepare and Implement a Biological Resources Management Plan.		
BIO-MM#6. Prepare and Implement a Restoration and Revegetation Plan.		
BIO-MM#7. Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).		
BIO-MM#8. Wildlife Exclusion Fencing.		
BIO-MM#9. Equipment Staging Areas.		
BIO-MM#10. Mono-Filament Netting.		
BIO-MM#11. Vehicle Traffic.		
BIO-MM#12. Entrapment Prevention.		
BIO-MM#13. Work Stoppage.		
BIO-MM#14. "Take" Notification and Reporting.		
BIO-MM#15. Post-Construction Compliance Reports.		

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Construction Impacts		
Special-Status Plants		
BIO #1: Construction of the HST alternatives would directly or indirectly impact suitable habitat that has potential to support special-status plant species.	Bio-MM #16: Conduct Preconstruction Surveys for Special-Status Plant Species and Special-Status Plant Communities Bio-MM #17: Prepare and Implement Plan for Salvage, Relocation and/or Propagation of Special-Status Plant Species Bio-MM #53: Compensate for Impacts on Special-Status Plant Species.	Less than significant
Special-Status Wildlife Species		
BIO #2: Construction of the HST alternatives would disturb suitable habitat that has potential to support special-status invertebrate species.	AVR-MM#1b. Minimize Light Disturbance during Construction. BIO-MM#18. Conduct Preconstruction Sampling and Assessment for Vernal Pool Fauna. BIO-MM#19. Seasonal Vernal Pool Work Restriction. BIO-MM#20. Implement and Monitor Vernal Pool Protection. BIO-MM#21. Implement Avoidance and Minimization Measures for the Valley Elderberry Longhorn Beetle. BIO-MM#49. Monitor Construction Activities within Jurisdictional Waters. BIO-MM#54. Compensate for Impacts on Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp. BIO-MM#55. Compensate for Impacts on Valley Elderberry Longhorn Beetle. BIO-MM#63. Compensate for Permanent and Temporary Impacts on Jurisdictional Waters. BIO-MM#65. Offsite Habitat Restoration, Enhancement and Preservation.	Less than significant
BIO #2: Construction of the HST alternatives would disturb the suitable habitat that has potential to support special-status reptiles and amphibian species.	AVR-MM#1b. Minimize Light Disturbance during Construction. BIO-MM#22. Conduct Preconstruction Surveys for Special-Status Reptile and Amphibian Species. BIO-MM#23. Conduct Special-Status Reptile and Amphibian Monitoring, Avoidance, and Relocation. BIO-MM#24. Conduct Protocol and Preconstruction Surveys for California Tiger Salamander. BIO-MM#25. Implement Avoidance and Minimization Measures for California Tiger Salamander. BIO-MM#26. Conduct Protocol-Level Surveys for Blunt-Nosed Leopard Lizard. BIO-MM#27. Phased Preconstruction Surveys for Blunt-Nosed Leopard Lizard. BIO-MM#28. Blunt-Nosed Leopard Lizard Avoidance. BIO-MM#56. Compensate for Impacts on California Tiger Salamander. BIO-MM#57. Compensate for Impacts on Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel. BIO-MM#65. Offsite Habitat Restoration, Enhancement and Preservation.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
BIO #2: Construction of the HST alternatives would disturb suitable habitat that has potential to support nesting special-status bird species (including raptors).	<p>AVR-MM#1b. Minimize Light Disturbance during Construction.</p> <p>BIO-MM#29. Conduct Preconstruction Surveys and Delineate Active Nest Exclusion Areas for Other Breeding Birds.</p> <p>BIO-MM#30. Conduct Preconstruction Surveys and Monitoring for Raptors.</p> <p>BIO-MM#31. Bird Protection.</p> <p>BIO-MM#32. Conduct Protocol and Preconstruction Surveys for Swainson's Hawks.</p> <p>BIO-MM#33. Swainson's Hawk Nest Avoidance and Monitoring.</p> <p>BIO-MM#34. Monitor Removal of Nest Trees for Swainson's Hawks.</p> <p>BIO-MM#35. Conduct Protocol Surveys for Burrowing Owls.</p> <p>BIO-MM#36. Burrowing Owl Avoidance and Minimization.</p> <p>BIO-MM#58. Compensate for Loss of Swainson's Hawk Nesting Trees.</p> <p>BIO-MM#59. Compensate for Loss of Burrowing Owl Active Burrows and Habitat.</p> <p>BIO-MM#65. Offsite Habitat Restoration, Enhancement and Preservation.</p>	Less than significant
BIO#2: Construction of the HST alternatives would disturb suitable habitat that has the potential to support special-status mammal species.	<p>BIO-MM#37. Conduct Preconstruction Surveys for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse.</p> <p>BIO-MM#38. Implement Avoidance and Minimization Measures for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse.</p> <p>BIO-MM#39. Implement Avoidance and Minimization Measures for Fresno Kangaroo Rat.</p> <p>BIO-MM#40. Conduct Preconstruction Surveys for Special-Status Bat Species.</p> <p>BIO-MM#41. Bat Avoidance and Relocation.</p> <p>BIO-MM#42. Bat Exclusion and Deterrence.</p> <p>BIO-MM#43. Conduct Preconstruction Surveys for American Badger and Ringtail.</p> <p>BIO-MM#44. American Badger and Ringtail Avoidance.</p> <p>BIO-MM#45. Conduct Protocol-Level Preconstruction Surveys for San Joaquin Kit Fox.</p> <p>BIO-MM#46. Minimize Impacts on San Joaquin Kit Fox.</p> <p>BIO-MM#60. Compensate for Destruction of San Joaquin Kit Fox Habitat.</p> <p>BIO-MM#65. Offsite Habitat Restoration, Enhancement and Preservation.</p>	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Special-Status Plant Communities		
BIO #3: Construction of the HST alternatives would disturb special-status plant communities, and riparian areas.	BIO-MM#16. Conduct Protocol-Level Preconstruction Surveys for Special-Status Plant Species and Special-Status Plant Communities. BIO-MM#47. Restore Temporary Riparian Impacts. BIO-MM#48. Restore Temporary Impacts on Jurisdictional Waters. BIO-MM#61. Compensate for Permanent Riparian Impacts. BIO-MM#62. Prepare and Implement a Site-Specific Comprehensive Mitigation and Monitoring Plan. BIO-MM#63. Compensate for Permanent and Temporary Impacts on Jurisdictional Waters. BIO-MM#65. Offsite Habitat Restoration, Enhancement and Preservation.	Less than significant
Jurisdictional Waters		
BIO #3: Construction of the HST alternatives would have direct and indirect impacts on jurisdictional waters.	BIO-MM#47. Restore Temporary Riparian Impacts. BIO-MM#48. Restore Temporary Impacts on Jurisdictional Waters. BIO-MM#49. Monitor Construction Activities within Jurisdictional Waters. BIO-MM#61. Compensate for Permanent Riparian Impacts. BIO-MM#62. Prepare and Implement a Site-Specific Comprehensive Mitigation and Monitoring Plan. BIO-MM#63. Compensate for Permanent and Temporary Impacts on Jurisdictional Waters. BIO-MM#65. Offsite Habitat Restoration, Enhancement and Preservation.	Less than significant
Conservation Areas		
BIO #3: Construction of the HST alternatives would disturb areas located in USFWS recovery plans.	BIO-MM#46. Minimize Impacts on San Joaquin Kit Fox. BIO-MM#60. Compensate for Destruction of San Joaquin Kit Fox Habitat.	Less than significant
Protected Trees		
BIO #3: Construction of the HST alternatives would disturb protected trees.	BIO-MM#50. Mitigation and Monitoring of Protected Trees. BIO-MM#64. Compensate for Impacts on Protected Trees. BIO-MM#65. Offsite Habitat Restoration, Enhancement and Preservation.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Project Impacts		
Special-Status Plant Species		
BIO #5: Project impacts from the HST alternatives would permanently impact special-status plant species or suitable habitat that has potential to support these species.	BIO-MM#16. Conduct Protocol-Level Preconstruction Surveys for Special-Status Plant Species and Special-Status Plant Communities. BIO-MM#17. Prepare and Implement Plan for Salvage, Relocation, and/or Propagation of Special-Status Plant Species. BIO-MM#53. Compensate for Impacts on Special-Status Plant Species.	Less than significant
Special-Status Wildlife Species		
BIO #6: Project impacts from the HST alternatives would permanently impact suitable habitat that has the potential to support special-status invertebrate species	BIO-MM#18. Conduct Preconstruction Sampling and Assessment for Vernal Pool Fauna. BIO-MM#19. Seasonal Vernal Pool Work Restriction. BIO-MM#20. Implement and Monitor Vernal Pool Protection. BIO-MM#21. Implement Avoidance and Minimization Measures for the Valley Elderberry Longhorn Beetle. BIO-MM#49. Monitor Construction Activities within Jurisdictional Waters. BIO-MM#54. Compensate for Impacts on Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp. BIO-MM#55. Compensate for Impacts on Valley Elderberry Longhorn Beetle. BIO-MM#63. Compensate for Permanent and Temporary Impacts on Jurisdictional Waters. BIO-MM#65. Offsite Habitat Restoration, Enhancement and Preservation. N&V-MM#3. Implement Proposed California High-Speed Train Project Noise Mitigation Guidelines.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
BIO #6: Project impacts from the HST alternatives would permanently impact suitable habitat that has the potential to support special-status reptiles and amphibian species.	BIO-MM#22. Conduct Preconstruction Surveys for Special-Status Reptile and Amphibian Species. BIO-MM#23. Conduct Special-Status Reptile and Amphibian Monitoring, Avoidance, and Relocation. BIO-MM#24. Conduct Protocol and Preconstruction Surveys for California Tiger Salamander. BIO-MM#25. Implement Avoidance and Minimization Measures for California Tiger Salamander. BIO-MM#26. Conduct Protocol-Level Surveys for Blunt-Nosed Leopard Lizard. BIO-MM#27. Phased Preconstruction Surveys for Blunt-Nosed Leopard Lizard. BIO-MM#28. Blunt-Nosed Leopard Lizard Avoidance. BIO-MM#48. Restore Temporary Impacts on Jurisdictional Waters. BIO-MM#49. Monitor Construction Activities within Jurisdictional Waters. BIO-MM#56. Compensate for Impacts on California Tiger Salamander. BIO-MM#57. Compensate for Impacts on Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel. BIO-MM#63. Compensate for Permanent and Temporary Impacts on Jurisdictional Waters. BIO-MM#65. Offsite Habitat Restoration, Enhancement and Preservation. N&V-MM#3. Implement Proposed California High-Speed Train Project Noise Mitigation Guidelines.	Less than significant
BIO #6: Project impacts from the HST alternatives would permanently impact suitable habitat that has the potential to support special-status bird species (including raptors).	BIO-MM#29. Conduct Preconstruction Surveys and Delineate Active Nest Exclusion Areas for Other Breeding Birds. BIO-MM#30. Conduct Preconstruction Surveys and Monitoring for Raptors. BIO-MM#31. Bird Protection. BIO-MM#32. Conduct Protocol and Preconstruction Surveys for Swainson's Hawks. BIO-MM#33. Swainson's Hawk Nest Avoidance and Monitoring. BIO-MM#34. Monitor Removal of Nest Trees for Swainson's Hawks. BIO-MM#35. Conduct Protocol Surveys for Burrowing Owls. BIO-MM#36. Burrowing Owl Avoidance and Minimization. BIO-MM#58. Compensate for Loss of Swainson's Hawk Nesting Trees. BIO-MM#59. Compensate for Loss of Burrowing Owl Active Burrows and Habitat. BIO-MM#65. Offsite Habitat Restoration, Enhancement and Preservation. N&V-MM#3. Implement Proposed California High-Speed Train Project Noise Mitigation Guidelines.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
BIO #6: Project impacts from the HST alternatives would permanently impact suitable habitat that has the potential to support special-status mammal species.	<p>BIO-MM#37. Conduct Preconstruction Surveys for Nelson's Antelope Squirrel Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse.</p> <p>BIO-MM#38. Implement Avoidance and Minimization Measures for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse.</p> <p>BIO-MM#39. Implement Avoidance and Minimization Measures for Fresno Kangaroo Rat.</p> <p>BIO-MM#40. Conduct Preconstruction Surveys for Special-Status Bat Species.</p> <p>BIO-MM#41. Bat Avoidance and Relocation.</p> <p>BIO-MM#42. Bat Exclusion and Deterrence.</p> <p>BIO-MM#43. Conduct Preconstruction Surveys for American Badger and Ringtail.</p> <p>BIO-MM#44. American Badger and Ringtail Avoidance.</p> <p>BIO-MM#45. Conduct Protocol-Level Preconstruction Surveys for San Joaquin Kit Fox.</p> <p>BIO-MM#46. Minimize Impacts on San Joaquin Kit Fox.</p> <p>BIO-MM#60. Compensate for Destruction of San Joaquin Kit Fox Habitat.</p> <p>BIO-MM#65. Offsite Habitat Restoration, Enhancement and Preservation.</p> <p>N&V-MM#3. Implement Proposed California High-Speed Train Project Noise Mitigation Guidelines.</p>	Less than significant
Special-Status Plant Communities		
BIO #7: Project impacts from the HST alternatives would permanently impact special-status plant communities, and riparian areas.	<p>BIO-MM#16. Conduct Protocol-Level Preconstruction Surveys for Special-Status Plant Species and Special-Status Plant Communities.</p>	Less than significant
Jurisdictional Waters		

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
BIO #7: Project impacts from the HST alternatives would permanently affect jurisdictional waters.	BIO-MM#47. Restore Temporary Riparian Impacts. BIO-MM#48. Restore Temporary Impacts on Jurisdictional Waters. BIO-MM#49. Monitor Construction Activities within Jurisdictional Waters. BIO-MM#61. Compensate for Permanent Riparian Impacts. BIO-MM#62. Prepare and Implement a Site-Specific Comprehensive Mitigation and Monitoring Plan. BIO-MM#63. Compensate for Permanent and Temporary Impacts on Jurisdictional Waters. BIO-MM#65. Offsite Habitat Restoration, Enhancement and Preservation.	Less than significant
Conservation Areas		
BIO #7: Project impacts from the BNSF Alternative would disturb portions of recovery plans.	Construction and Project Mitigation Measures BIO-MM#16 through BIO-MM#65 .	Less than significant
BIO #7: Project impacts from the HST alternatives would disturb portions of the Allensworth Ecological Reserve.	Construction and Project Mitigation Measures BIO-MM#16 through BIO-MM#65	Less than significant
Protected Trees		
BIO #7: Project impacts from the HST alternatives would permanently affect protected trees.	BIO-MM#50. Mitigation and Monitoring of Protected Trees. BIO-MM#64. Compensate for Impacts on Protected Trees. BIO-MM#65. Offsite Habitat Restoration, Enhancement and Preservation.	Less than significant
Wildlife Movement Corridors		
BIO #8: Project impacts from the HST alternatives would permanently reduce the functionality of wildlife movement corridors and habitat linkages.	BIO-MM#51. Install Flashing or Slats within Security Fencing. BIO-MM#52. Construction in Wildlife Movement Corridors. BIO-MM#54. Compensate for Impacts on Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp. BIO-MM#55. Compensate for Impacts on Valley Elderberry Longhorn Beetle. BIO-MM#56. Compensate for Impacts on California Tiger Salamander. BIO-MM#57. Compensate for Impacts on Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson's Antelope Squirrel. BIO-MM#58. Compensate for Loss of Swainson's Hawk Nesting Trees. BIO-MM#59. Compensate for Loss of Burrowing Owl Active Burrows and Habitat. BIO-MM#60. Compensate for Destruction of San Joaquin Kit Fox Habitat.	Less than Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Hydrology and Water Resources		
Construction Impacts		
There are no construction impacts for hydrology and water quality.	No mitigation required	N/A
Project Impacts		
There are no project impacts for hydrology and water quality.	No mitigation required	N/A
Geology, Soils, and Seismicity		
Construction Impacts		
There are no construction impacts for geology, soils, and seismicity.	No mitigation required	N/A
Project Impacts		
There are no project impacts for geology, soils, and seismicity.	No mitigation required	N/A
Hazardous Materials and Wastes		
Construction Impacts		
HMW #4: Temporary hazardous material and waste activities in proximity of schools (within 0.25 mile of a school).	HMW-MM#1: Limit use of extremely hazardous materials near schools during construction.	Less than significant
Project Impacts		
There are no project impacts for Hazardous Materials and Wastes.	No mitigation required	N/A

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Safety and Security		
Construction Impacts		
There are no significant construction impacts for safety and security.	No mitigation required	N/A
Project Impacts		
S&S #10: Need for Expansion of Existing Fire, Rescue, and Emergency Services Facilities.	S&S-MM #1: Monitor response of local fire, rescue, and emergency service providers to incidents at stations and the HMF and provide a fair share cost of service.	Less than significant
Socioeconomics, Communities, and Environmental Justice		
Construction Impacts		
There are no construction impacts for socioeconomics, communities, and environmental justice.	No mitigation required	N/A
Project Impacts		
SO #6: Division of existing community Ponderosa Road/Edna Way east of Hanford, the Newark Avenue vicinity northeast of Corcoran, and Crome.	SO-MM #1: Implement measures to reduce impacts associated with the division of residential neighborhoods.	Significant
SO #6: Division of existing community in the Bakersfield Northeast and Central districts.	SO-MM #2: Implement measures to reduce impacts associated with the division of existing communities.	Significant
SO #6: Division of existing community in the Bakersfield Northwest District.	SO-MM #2: Implement measures to reduce impacts associated with the division of existing communities.	Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
SO #6: Displacement of Bakersfield High School's Industrial Arts building.	SO-MM #3: Implement measures to reduce impacts associated with the displacement of Bakersfield High School facilities.	Less than significant
SO #6: Displacement of the Mercado Latino Tianguis.	SO-MM #3: Implement measures to reduce impacts associated with the displacement of the Mercado Latino Tianguis.	Less than significant
SO #6: Displacement of the Fresno Rescue Mission, Bakersfield Homeless Shelter associated facilities and programs.	SO-MM #3: Implement measures to reduce impacts associated with the displacement of the Fresno Rescue Mission, Bakersfield Homeless Shelter and associated facilities.	Less than significant
SO #6: Displacement of Mercy Hospital medical complex facilities.	SO-MM #3: Implement measures to reduce impacts associated with the displacement of Mercy Hospital medical facilities.	Less than significant
SO #6: Displacement of religious facilities.	SO-MM #3: Implement measures to reduce impacts associated with the displacement of religious facilities.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
SO #6: Displacement of government facilities—Bakersfield public works corporation yard, the fleet services downtown facility, Kern County Health and Human Services Department, and Kern Mental Health office—as well as parking associated with the Bakersfield Convention Center and temporary construction use of Owens Intermediate School parking area.	SO-MM#3: Implement measures to reduce impacts associated with the displacement of facilities.	Less than significant
Station Planning, Land Use, and Development		
Construction Impacts		
LU #1: Temporary and intermittent disruption of access to some properties, temporarily inconvenience nearby residents, and temporarily change the intensity of agricultural operations on some lands.	Construction Management Plan (see Section 3.12.10, Socioeconomics, Communities, and Environmental Justice). Dust Control Measures (see Section 3.3.8, Air Quality and Global Climate Change). AQ-MM#1: Reduce Criteria Exhaust Emissions from Construction Equipment. AQ-MM#2: Reduce Criteria Exhaust Emissions from On-Road Construction Equipment. AQ-MM#3: Reduce the Potential Impact of Concrete Batch Plants. AQ-MM#4: Offset Emissions through the VERA Program. N&V-MM#1: Construction Noise Mitigation Measures. N&V-MM#2: Construction Vibration Mitigation Measures. AVR-MM#1a: Minimize Visual Disruption from Construction Activities. AVR-MM#1b: Minimize Light Disturbance during Construction.	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Project Impacts		
LU #2: A substantial change in intensity of land use incompatible with adjacent land uses.	AG-MM#1: Preserve the Total Amount of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland.	Significant
LU #3: Some unplanned changes in the use of existing adjacent land, regardless of the amount of parking provided at the station.	AG-MM#1: Preserve the Total Amount of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland.	Significant
LU #4: The HMF would change the pattern and intensity of land uses in the vicinity of the HMF, resulting in uses incompatible with adjacent agricultural uses.	AG-MM#1: Preserve the Total Amount of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland.	Significant
LU #5: Indirect changes to adjacent lands at the Kings/Tulare Regional Station sites would substantially change the pattern and intensity of land use in a way that would be incompatible with adjacent land uses.	AG-MM#1: Preserve the Total Amount of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland.	Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Agricultural Lands		
Construction Impacts		
There are no significant construction impacts for agricultural lands.	No mitigation required	N/A
Project Impacts		
AG #4: Permanent conversion of agricultural land to nonagricultural use.	AG-MM #1: Preserve the total amount of prime farmland, farmland of statewide importance, farmland of local importance, and unique farmland.	Significant
AG#6: Effects on Land under Williamson Act or FSZ Contracts, Local Zoning, or Conservation Easement Lands.	AG-MM #1: Preserve the total amount of prime farmland, farmland of statewide importance, farmland of local importance, and unique farmland.	Less than Significant
Parks, Recreation, and Open Space		
Construction Impacts		
PK#1: Common Aesthetics and Visual Quality Impacts. For all alternatives, construction activities would cause visual impacts to park, recreation, and open space resources.	Mitigation measures as outlined in Section 3.16, Aesthetics and Visual Resources: AVR-MM#1a and AVR-MM#1b	Less than significant
PK #1: Construction activities would create noise at Father Wyatt Park.	Mitigation Measures as outlined in Section 3.4, Noise and Vibration. N&V-MM#1 and N&V-MM#2	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
PK #1: Construction activities would create closures of some areas of Kern River Parkway, including bike and equestrian facilities.	PC-MM #1: Compensation for staging in and temporary closures of park property during construction.	Less than significant
PK #1: Construction activities would create noise at the McMurtrey Aquatic Center.	Mitigation Measures as outlined in Section 3.4, Noise and Vibration. N&V-MM#1 and N&V-MM#2	Less than significant
PK#1: Construction activities would create closures of some areas of park facilities and increase noise exposure at the Mill Creek Linear Park.	PC-MM #1: Compensation for staging in and temporary closures of park property during construction. Mitigation Measures as outlined in Section 3.4, Noise and Vibration. N&V-MM#1 and N&V-MM#2	Less than significant
PK #1: Construction activities would create noise at the Bakersfield Amtrak Station Playground.	Mitigation Measures as outlined in Section 3.4, Noise and Vibration. N&V-MM#1 and N&V-MM#2	Less than significant
PK #1: For all alternatives, construction activities would cause visual impacts to school district recreation facilities.	Mitigation measures as outlined in Section 3.16, Aesthetics and Visual Resources: AVR-MM#1a and AVR-MM#1b	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
PK #1: Construction activities would create noise at Bakersfield High School.	Mitigation Measures as outlined in Section 3.4, Noise and Vibration. N&V-MM#1 and N&V-MM#2	Less than significant
Project Impacts		
PK #2: The project would require the acquisition of approximately 1.7 acres of Colonel Allensworth State Historic Park.	PP-MM#1: Acquisition of Park Property. PP-MM#2: Avoidance of Colonel Allensworth State Historic Park.	Less than significant
PK#2 Allensworth Ecological Reserve. The BNSF Alternative would require the acquisition of approximately 7.3 acres of parkland.	PP-MM#1: Acquisition of Park Property.	Less than significant
PK#4 Father Wyatt Park. HST operation activities for the Corcoran Elevated Alternative would increase noise exposure.	Mitigation measures as outlined in Section 3.4, Noise and Vibration: N&V-MM#3	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
PK#4 Father Wyatt Park. HST operation for the BNSF Alternative would substantially degrade the existing visual character of the site and its surroundings.	Mitigation measures as outlined in Section 3.16, Aesthetics and Visual Resources: AVR-MM#2a – #2f .	Less Than Significant
PK#4 Colonel Allensworth State Historic Park. The BNSF Alternative would introduce a modern feature not consistent with the historic atmosphere of the park.	Mitigation measures as outlined in Section 3.16, Aesthetics and Visual Resources: AVR-MM#2a – #2f , and Section 3.17, Cultural and Paleontological Resources.	Significant
PK#4 Colonel Allensworth State Historic Park. HST operation of the BNSF Alternative would increase noise exposure.	Mitigation measures as outlined in Section 3.4, Noise and Vibration: N&V-MM#3 .	Less than significant
PK#4 Kern River Parkway. HST operation of the BNSF, Bakersfield South, and Bakersfield Hybrid Alternatives would increase noise exposure.	Mitigation measures as outlined in Section 3.4, Noise and Vibration: N&V-MM#3 .	Less than significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
PK#4 Kern River Parkway. HST operation for the BNSF, Bakersfield South, and Bakersfield Hybrid Alternatives would substantially degrade the existing visual character of the site and its surroundings.	Mitigation measures as outlined in Section 3.16, Aesthetics and Visual Resources: AVR-MM#2a – #2f .	Significant
PK#4 McMurtry Aquatic Center. HST operation of the Bakersfield South, and Bakersfield Hybrid Alternative would increase noise exposure.	Mitigation measures as outlined in Section 3.4, Noise and Vibration: N&V-MM#3 .	Less than significant
PK#4 Mill Creek Linear Park. HST operation of the BNSF, Bakersfield South, and Bakersfield Hybrid Alternatives would increase noise exposure.	Mitigation measures as outlined in Section 3.4, Noise and Vibration: N&V-MM#3 .	Less than significant
PK#4 Mill Creek Linear Park. HST operation of the BNSF, Bakersfield South, and Bakersfield Hybrid Alternatives would substantially degrade the existing visual character of the site and its surroundings.	Mitigation measures as outlined in Section 3.16, Aesthetics and Visual Resources: AVR-MM#2a – #2f .	Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
PK#4 Bakersfield Amtrak Station Playground. Bakersfield Station Alternatives would create an increase in use that would result in physical deterioration; HST operation of the BNSF Alternative would increase noise exposure.	<p>PP-MM#3: Collect Additional Maintenance Funds.</p> <p>Mitigation measures as outlined in Section 3.4, Noise and Vibration: N&V-MM#3.</p>	Less than significant
PK#4 Bakersfield Amtrak Station Playground. HST operation of the BNSF, Bakersfield South, and Bakersfield Hybrid Alternatives would substantially degrade the existing visual character of the site and its surroundings.	<p>Mitigation measures as outlined in Section 3.16, Aesthetics and Visual Resources: AVR-MM#2a – #2f.</p>	Significant
PK#4 Bakersfield High School. HST operation for the BNSF Alternative would increase noise exposure.	<p>Mitigation measures as outlined in Section 3.4, Noise and Vibration: N&V-MM#3.</p>	Less than significant
PK#4 Bakersfield High School. HST operation for the BNSF Alternative would substantially degrade the existing visual setting of the recreation facilities.	<p>Mitigation measures as outlined in Section 3.16, Aesthetics and Visual Resources: AVR-MM#2a – #2f.</p>	Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Aesthetics and Visual Resources		
Construction Impacts		
AVR #2: Visual disturbance during construction.	AVR-MM #1a: Minimize visual disruption during construction activities.	Less than significant
AVR #3: Nighttime lighting during construction.	AVR-MM #1b: Minimize light disturbance during construction.	Less than significant
Project Impacts		
AVR #4: Lower visual quality in the Rural Valley/Agricultural Landscape Unit.	AVR-MM #2a: Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context (Kings/Tulare Regional Station) AVR-MM #2b: Integrate Elevated Guideway into Affected Cities, Parks, Trail, and Urban Core Designs AVR-MM #2c: Screen Elevated Guideways Adjacent to Residential Areas AVR-MM #2d: Replant Unused Portions of Lands Acquired for the HST AVR-MM #2e: Provide Offsite Landscape Screening Where Appropriate AVR-MM #2f: Landscape Treatments along the HST Project Overcrossings and Retained Fill Elements of the HST AVR-MM #2g: Provide Sound Barrier Treatments AVR-MM #2h: Screen Traction Power Distribution Stations, HMF, and Radio Communication Towers	Significant
AVR #4: Lower visual quality in Corcoran, Wasco, Shafter, and Allensworth State Historic Park Landscape Units.	AVR-MM #2a: Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context (Kings/Tulare Regional Station) AVR-MM #2b: Integrate Elevated Guideway into Affected Cities, Parks, Trail, and Urban Core Designs AVR-MM #2c: Screen Elevated Guideways Adjacent to Residential Areas AVR-MM #2d: Replant Unused Portions of Lands Acquired for the HST AVR-MM #2e: Provide Offsite Landscape Screening Where Appropriate AVR-MM #2f: Landscape Treatments along the HST Project Overcrossings and Retained Fill Elements of the HST AVR-MM #2g: Provide Sound Barrier Treatments	Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
AVR #4: Lower visual quality in the Rosedale, Kern River, and Central Bakersfield Landscape Units.	AVR-MM #2a: Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context (Kings/Tulare Regional Station) AVR-MM #2b: Integrate Elevated Guideway into Affected Cities, Parks, Trail, and Urban Core Designs AVR-MM #2c: Screen Elevated Guideways Adjacent to Residential Areas AVR-MM #2d: Replant Unused Portions of Lands Acquired for the HST AVR-MM #2e: Provide Offsite Landscape Screening Where Appropriate AVR-MM #2f: Landscape Treatments along the HST Project Overcrossings and Retained Fill Elements of the HST AVR-MM #2g: Provide Sound Barrier Treatments	Significant
AVR #4: The HST project would create a new source of substantial light and glare.	AVR-MM #1b: Minimize Light Disturbance During Construction	Less than significant
AVR #4: TPSS would alter visual character or block views.	AVR-MM #2h: Screen Traction Power Distribution Stations, HMF, and Radio Communication Towers	Less than significant
AVR #4: Lower visual quality due to HMF alternatives.	AVR-MM #1a: Minimize Visual Disruption from Construction Activities AVR-MM #1b: Minimize Light Disturbance during Construction AVR-MM #2c: Screen Elevated Guideways Adjacent to Residential Areas AVR-MM #2d: Replant Unused Portions of Lands Acquired for the HST AVR-MM #2e: Provide Offsite Landscape Screening Where Appropriate AVR-MM #2h: Screen Traction Power Distribution Stations, HMF, and Radio Communication Towers	
AVR #4: Noise wall would block views.	AVR-MM #2a: Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context AVR-MM #2b: Integrate Elevated Guideway into Affected Cities, Parks, Trail, and Urban Core Designs AVR-MM #2c: Screen Elevated Guideways Adjacent to Residential Areas AVR-MM #2d: Replant Unused Portions of Lands Acquired for the HST AVR-MM #2e: Provide Offsite Landscape Screening Where Appropriate AVR-MM #2f: Landscape Treatments along the HST Project Overcrossings and Retained Fill Elements of the HST	Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
AVR #5: Lower visual quality at Bakersfield High School.	AVR-MM #1a: Minimize Visual Disruption from Construction Activities AVR-MM #1b: Minimize light disturbance during construction AVR-MM #2a: Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context AVR-MM #2b: Integrate Elevated Guideway into Affected Cities, Parks, Trail, and Urban Core Designs AVR-MM #2c: Screen Elevated Guideways Adjacent to Residential Areas AVR-MM #2d: Replant Unused Portions of Lands Acquired for the HST AVR-MM #2e: Provide Offsite Landscape Screening Where Appropriate	Significant
AVR #5: Lower visual quality at Owens Middle School.	AVR-MM #1a: Minimize Visual Disruption from Construction Activities AVR-MM #2a: Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context AVR-MM #2c: Screen Elevated Guideways Adjacent to Residential Areas AVR-MM #2d: Replant Unused Portions of Lands Acquired for the HST AVR-MM #2e: Provide Offsite Landscape Screening Where Appropriate	Significant
AVR #5: Lower visual quality at College of the Sequoias.	AVR-MM #1a: Minimize Visual Disruption from Construction Activities AVR-MM #2c: Screen Elevated Guideways Adjacent to Residential Areas AVR-MM #2d: Replant Unused Portions of Lands Acquired for the HST AVR-MM #2e: Provide Offsite Landscape Screening Where Appropriate	Less than significant
AVR #5: Lower visual quality at Our Lady of Guadalupe School.	AVR-MM #1a: Minimize Visual Disruption from Construction Activities AVR-MM #2a: Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context AVR-MM #2c: Screen Elevated Guideways Adjacent to Residential Areas AVR-MM #2d: Replant Unused Portions of Lands Acquired for the HST AVR-MM #2e: Provide Offsite Landscape Screening Where Appropriate	Significant
AVR #5: Lower visual quality at Bethel Christian School.	AVR-MM #1a: Minimize Visual Disruption from Construction Activities AVR-MM #2a: Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context AVR-MM #2c: Screen Elevated Guideways Adjacent to Residential Areas AVR-MM #2d: Replant Unused Portions of Lands Acquired for the HST AVR-MM #2e: Provide Offsite Landscape Screening Where Appropriate	Significant

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Cultural and Paleontological Resources		
Construction Impacts		
CUL #1: Potential adverse effects on Archaeological Resources due to construction activities	CUL-MM #1: Complete Inventory for Archaeological Resources and Comply with the Stipulations Regarding the Treatment of Archaeological Resources in the PA and MOA CUL-MM #2: Conduct Archaeological Training CUL-MM #3: Conduct Archaeological Monitoring in Areas of Sensitivity, Halt Work in the Event of a Discovery CUL-MM #4: Comply with State and Federal Law for Human Remains CUL-MM #5: Conduct Preconstruction Geoarchaeological Testing in Proximity to CA-KER-2507	Less than significant
CUL #2: Potential adverse effects on Historic Architectural Resources due to construction activities.	CUL-MM #7: Avoid and/or Monitor Adverse Construction Vibration Effects CUL-MM #8: Implement Protection and/or Stabilization Measures CUL-MM #9: Avoid Historic Architectural Resources at the Fresno Works-Fresno Heavy Maintenance Facility Site CUL-MM #11: Minimize Adverse Operational Noise Effects CUL-MM #12: Prepare and Submit Additional Recordation and Documentation CUL-MM #13: Prepare Interpretive or Educational Materials CUL-MM #14: Plan Repair of Inadvertent Damage CUL-MM #15: Visual Screening	Significant and unavoidable for some properties, while less than significant for others. (See Table 3.17-11 for details)
CUL #3: Potential adverse effects on Paleontological Resources due to construction activities.	CUL-MM #16: Engage paleontological resources specialist to direct monitoring during construction CUL-MM #17: Prepare and implement a Paleontological Resource Monitoring and Mitigation Plan CUL-MM #18: Halt construction when paleontological resources are found	Less than significant
Project Impacts	There are no significant project impacts for cultural and paleontological resources.	
	No mitigation required	N/A

Table S-3
HST Mitigation Measures

Impact	Mitigation Measure	CEQA Level of Significance after Mitigation
Regional Growth		
Construction Impacts		
There are no construction impacts for regional growth.	No mitigation required	N/A
Project Impacts		
There are no significant project impacts for regional growth.	No mitigation required	N/A
Cumulative Impacts		
Construction Impacts		
CUM-N&V: The project's contribution to cumulative construction noise impacts.	CUM-N&V-MM#1: Consult with agencies regarding construction activities.	Cumulatively Considerable
CUM-SO: The project's contribution to cumulative socioeconomic, communities, and environmental justice impacts during construction.	CUM-SO-MM#1: Consult with agencies regarding construction activities. CUM-SO-MM#2: Public outreach.	Cumulatively Considerable
CUM-VQ: The project's contribution to cumulative visual impacts.	CUM-VQ-MM#1: Consult with agencies on HST project design.	Cumulatively Considerable
Acronyms: CEQA = California Environmental Quality Act CRHR = California Register of Historical Resources HABS = Historic American Buildings Survey HAER = Historic American Engineering Record HALS = Historic American Landscapes Survey HST = high-speed train NRHP = National Register of Historic Places		

Table S-4
Environmental Impacts Differentiating HMF Alternatives

Impact	HMF Alternatives					Mitigation Measure	CEQA Level of Significance after Mitigation				
	Fresno Works—Fresno	Kings County—Hanford	Kern Council of Governments—								
			Wasco	Shafter East	Shafter West						
Transportation											
Project Impacts											
TR #14: Number of HMF future (2035) plus project site roadway impacts.	0	1	0	1	1	TR-MM #8: Add new lanes to roadway.	Less than significant				
TR #14: Number of HMF existing plus project intersection impacts	2	0	1	0	0	TR MM#3: Add Signal to Intersection to Improve LOS/Operation.	Less than Significant				
TR #14: Number of HMF future (2035) plus project site intersection impacts.	3	2	1	1	1	TR-MM #10 and TR-MM #12	Less than significant				
Noise and Vibration											
Project Impacts											
N&V #3: Number of sensitive receivers impacted by HMF operational noise.	100	6	327	6	8	N&V-MM#3 through N&V-MM#6	Potentially significant				
Biological Resources and Wetlands											
Project Impacts											
BIO #2 and #6: Impacts to areas that have potential to support special-status wildlife species	Yes	Yes	Yes	Yes	Yes	BIO-MM#18 through BIO-MM#49, BIO-MM#51 through BIO-MM#61, BIO-MM#63, BIO-MM#65	Less than significant				
BIO #3 and #7: Impacts to jurisdictional waters.	Yes	Yes	Yes	Yes	No	BIO-MM#47 through BIO-MM#49, BIO-MM#61 through BIO-MM#63, BIO-MM#65	Less than Significant				

Table S-4
Environmental Impacts Differentiating HMF Alternatives

Impact	HMF Alternatives					Mitigation Measure	CEQA Level of Significance after Mitigation		
	Fresno Works—Fresno	Kings County—Hanford	Kern Council of Governments—						
			Wasco	Shafter East	Shafter West				
BIO #3 and #7: Impacts to a recovery plan.	No	No	Yes	No	No	BIO-MM#16 through BIO-MM#65.	Less than significant		
BIO #3 and #7: Impacts to protected trees.	Yes	No	No	No	No	BIO-MM#50, BIO-MM#64, BIO-MM#65	Less than significant		
Agricultural Lands									
Project Impacts									
AG #4: Permanent conversion of agricultural land to nonagricultural use. Operation of the project would affect Important Farmland by converting to nonagricultural uses.	390 acres impacted	485 acres impacted	409 acres impacted	489 acres impacted	455 acres impacted	AG-MM#1: Preserve the total amount of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland.	Significant and unavoidable		
Aesthetics and Visual Resources									
Project Impacts									
AVR #4: Lower visual quality due to HMF alternatives.	Yes	Yes	Yes	Yes	Yes	AVR-MM #1a, AVR-MM #1b, AVR-MM #2c, AVR-MM #2d, AVR-MM #2e, and AVR-MM #2h.	Less than significant		
Acronyms: CEQA = California Environmental Quality Act HMF = heavy-maintenance facility									